SONY

3-757-928-**21** (1)

Digital Audio Tape Deck

Operating Instructions

DAT
Digital Audio Tape

SBM
Super Bit Mapping

DTC-2000ES

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WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

CAUTION

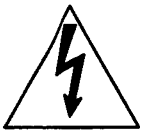
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,

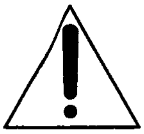
DO NOT REMOVE COVER (OR BACK).

NO USER-SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Owner's Record

The model and serial numbers are located on the rear of the unit. Record the serial number in the space provided below. Refer to them whenever you call upon your Sony dealer regarding this product.

Model No. DTC-2000ES Serial No. ______________

IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE, OR LOSSES OR EXPENSES RESULTING FROM ANY DEFECTIVE PRODUCT OR THE USE OF ANY PRODUCT.

INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- — Reorient or relocate the receiving antenna.
- — Increase the separation between the equipment and the receiver.
- — Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- — Consult the dealer or an experienced radio/TV technician for help.

CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

For the customers in Canada

CAUTION

TO PREVENT ELECTRIC SHOCK, DO NOT USE THIS POLARIZED AC PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

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Digital Audio Tape

DAT (Digital Audio Tape) is a new recording system which digitizes the audio signal and records it on a DAT cassette tape.

DAT records the audio signal by converting the analog sound into a digital signal using a system called PCM (Pulse Code Modulation). Its accurate processing of the audio signal allows recording/playback with lower wow and flutter, wider dynamic range, lower distortion rate, and a superb signal-to-noise ratio. In addition to the audio signal, various control codes called sub-codes can be written on the DAT cassette for a variety of convenient playback/tape editing operations. Except for the absolute time, these sub-codes can be rewritten after the recording of the audio signal.

Precautions

On safety

- Operate the unit only on 120 V AC, 60 Hz.
- One blade of the plug is wider than the other for the purpose of safety and will fit into the power outlet only one way. If you are unable to insert the plug fully into the outlet, contact your dealer.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by grasping the plug. Never pull the cord itself.

On operation

Before connecting a program source, be sure to unplug the unit.

Installation

Do not install the unit in a location near heat sources such as radiators or air ducts, or in places subject to direct sunlight, excessive dust, mechanical vibration or shock.

Moisture condensation

If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit. In this condition, the tape may adhere to the head drum and become damaged, or the unit may not operate correctly. Always remove the cassette when the unit is not in use.

If moisture is present...

- Function controls will not operate.
- All operations will stop.
- CAUTION appears in the display window.

If these symptoms appear, leave the unit turned on for about an hour until the moisture disappears.

Note

To close the cassette lid, press ≙ OPEN/CLOSE. Do not attempt to close it by pushing it with your hand.

For the customers in the U.S.A.

For detailed safety precautions, see the "IMPORTANT SAFEGUARDS" leaflet.

If you have any question or problem concerning your unit, please consult your nearest Sony dealer.

Features

Superb sound quality

Pulse A/D converter

A 1-bit A/D converter in the A/D converter section is designed to eliminate zero-cross distortion to produce clear and elegant sound.

Pulse D/A converter

Superior playback performance is achieved through the unit's pulse D/A converter.

SBM (Super Bit Mapping) and emphasis processing

The DTC-2000ES marks the first appearance on a component DAT recorder of Super Bit Mapping and emphasis processing — functions previously available only on professional DAT models.

Super Bit Mapping reduces noise at the frequency levels most discernible to the human ear, and re-integrates sound information subtracted during the A/D conversion process, greatly improving the dynamic audible range and sound quality of the recorded signal during analog recording.

Emphasis processing automatically amplifies high-bandwidth signals during analog recording, then attenuates the emphasized signals during playback to sharply reduce high-bandwidth noise.

44.1-kHz analog recording capability

By supporting the recording of analog sources at a sampling frequency of 44.1 kHz, the DTC-2000ES allows you to record from DAT tape to a MiniDisc recorder through a digital-to-digital connection.

SCMS (Serial Copy Management System)

This unit uses the Serial Copy Management System that permits one-generation digital-to-digital recording CD sound or other digital formats (see page 70).

Three sampling frequencies

Recording and playback are possible at three sampling frequencies (48 kHz, 44.1 kHz and 32 kHz).

48 kHz: For analog and digital input signals in standard mode.
44.1 kHz: For compact disc and pre-recorded DAT tapes.
32 kHz: For analog input signals in long-play mode.

Long-play mode

This unit supports long-play mode for recording or playback of analog input signals for up to four consecutive hours when using DT-120 DAT cassette tape. The sampling frequency of long-play mode is 32 kHz.

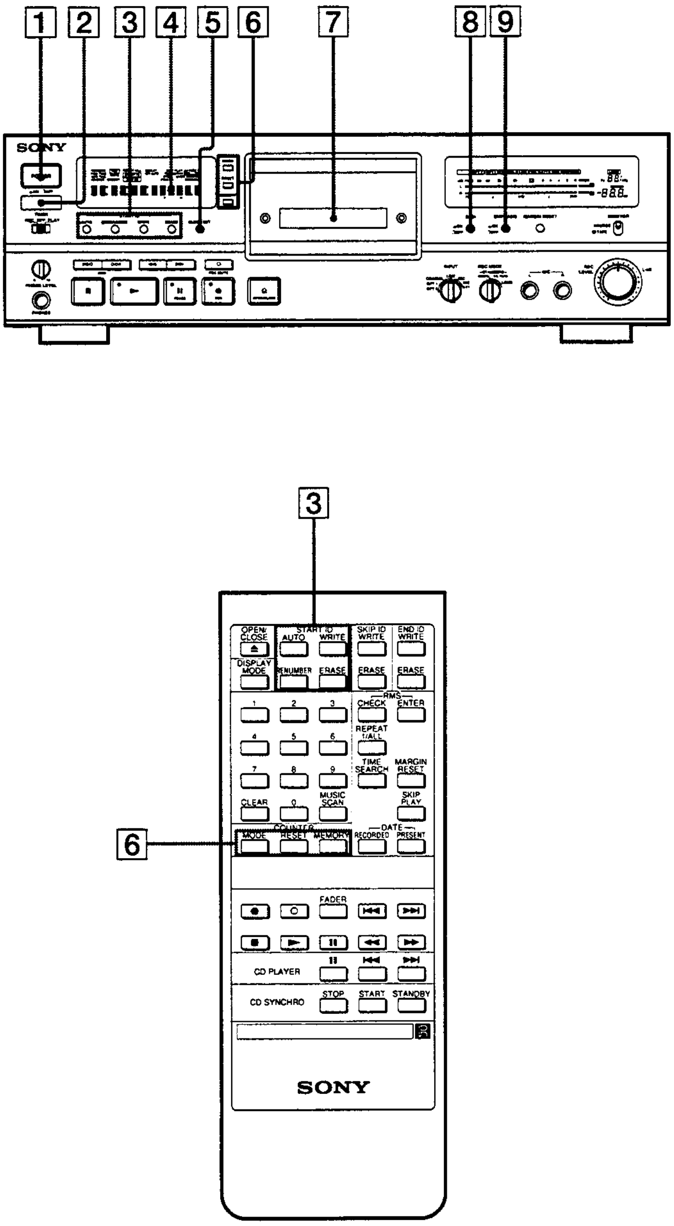
Wide variety of sub-codes

This unit allows you to record sub-codes such as start IDs, program numbers, skip IDs, and absolute time data, enabling you to quickly locate tunes and display the playback time the same way you would when playing compact discs.

Viewable cassette operation

You can view the tape operation through a window in the lid of the cassette compartment. Cassette loading time has been significantly reduced by a revolutionary new transport mechanism.

A



1
2
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7
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9
SONY
OPEN/CLOSE
START ID
AUTO
WRITE
SKIP ID WRITE
END ID WRITE
DISPLAY MODE
RENUMBER
ERASE
ERASE
ERASE
RMS
CHECK
ENTER
1
2
3
REPEAT 1/ALL
4
5
6
7
8
9
TIME SEARCH
MARGIN RESET
CLEAR
0
MUSIC SCAN
SKIP PLAY
COUNTER
MODE
RESET
MEMORY
DATE
RECORDED
PRESENT
FADER
CD PLAYER
CD SYNCHRO
STOP
START
STANDBY
SONY

Location and Function of Controls

Refer to pages indicated in parentheses for details

Front Panel/Remote Commander A

1 POWER button
Turns the power on and off.

2 Remote sensor
Receives signals from the remote commander.

3 START ID buttons
AUTO: Press to turn the AUTO indicator on and off. When the AUTO indicator is lit, start IDs are automatically written during recording. When the AUTO indicator is not lit, a start ID is written whenever you press START ID WRITE. (39,44)
RENUMBER: Press to renumber all programs on a tape. If the tape has start IDs only, the tape rewinds to the beginning and program numbers are written starting from 1. (46)
WRITE: Press to write a start ID during recording or playback. (41)
ERASE: Press to erase a start ID. When a start ID is written together with a program number, both codes are simultaneously erased when you press this button.(43,47)

4 Display window (left)
Indicates the operating status.

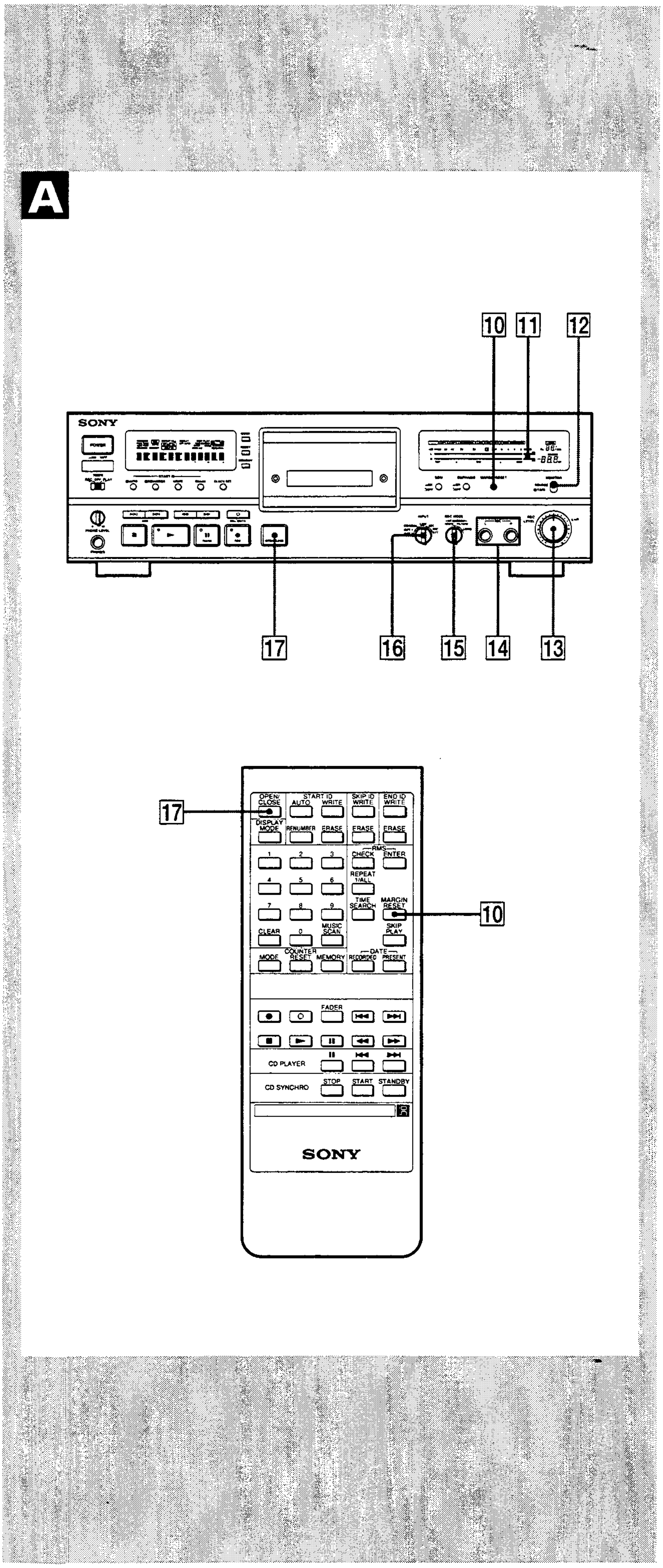
5 CLOCK SET button
Press to set the built-in clock. (18)

6 Counter setting buttons
MODE button: Press to select the display of absolute time, elapsed playing time, remaining cassette playing time, and tape running time (linear counter). (19,55)
RESET button: Press to zero the linear counter. (60)
MEMORY button: Press to memorize a position (memory play and memory stop functions). (60)

7 Cassette lid/compartment
Insert a cassette with the window side up and the safety tab facing you. A window in the lid of the cassette compartment allows viewing of the cassette operation. (20)

8 SBM (Super Bit Mapping) switch
Set to ON for Super Bit Mapping during recording an analog or digital source through the LINE IN jacks in STANDARD recording mode (REC MODE switch). (23)

9 EMPHASIS switch
Press to add emphasis during analog recording. (25)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11
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SONY
17
16
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13
17
10
OPEN/CLOSE
START ID AUTO
WRITE
SKIP ID WRITE
END ID WRITE
DISPLAY MODE
RENUMBER
ERASE
ERASE
ERASE
1
2
3
RMS CHECK
ENTER
REPEAT 1/ALL
4
5
6
7
8
9
TIME SEARCH
MARGIN RESET
CLEAR
0
MUSIC SCAN
SKIP PLAY
MODE
COUNTER RESET
MEMORY
DATE RECORDED
PRESENT
FADER
CD PLAYER
CD SYNCHRO
STOP
START
STANDBY
SONY

Location and Function of Controls

10 MARGIN RESET button
Press to reset the MARGIN indication. "- -" appears. (30)

11 Display window (right)
Shows the signal level during recording and playback.

12 MONITOR switch
Use during recording to select the signal output from the LINE OUT connector, DIGITAL OUT connector, and the PHONES jack. Set to SOURCE to output the source signal. Set to TAPE to output the tape recorded signal. During playback, signal monitoring is possible at either setting. (29)

13 REC LEVEL (recording level) controls
Use to adjust the recording level and balance during analog signal recording. The outer knob controls the L (left) channel level and the inner knob the R (right) channel level. Adjust both knobs together, or independently by turning one knob while holding the other. Recording level adjustment is unnecessary when recording digital signals. (30)

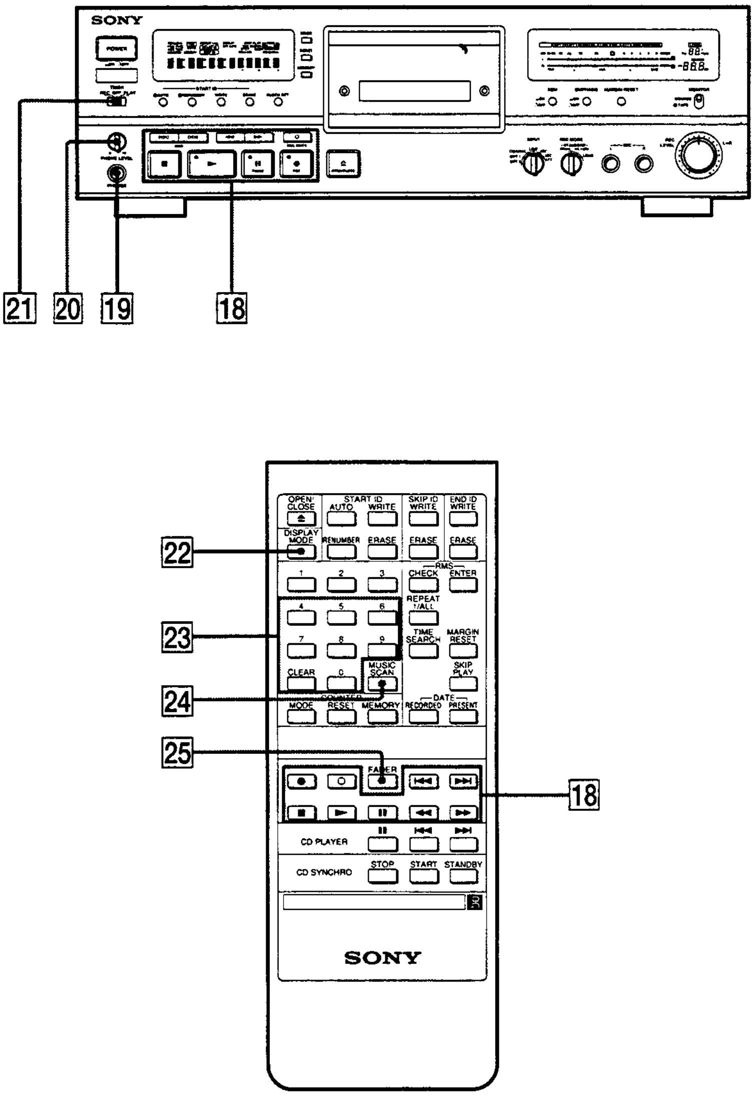
14 MIC (microphone) jacks (L/R)
Connect microphones with a phone plug here.

15 REC MODE selector
Normally set to STANDARD. Set to LONG to record analog or digital signals at 32-kHz in long-play mode. (31)

16 INPUT selector switch
Selects the input signal to be recorded.
- LINE: For recording from a sound source connected to the LINE IN jacks. (14)
- COAXIAL: For recording from a sound source connected to the DIGITAL IN (COAXIAL) jack. (14,26)
- OPT1: For recording from a sound source connected to the DIGITAL IN (OPT1) jack. (14,26)
- OPT2: For recording from a sound source connected to the DIGITAL IN (OPT2) jack. (14,26)
- MIC: For recording from microphones connected to the MIC jacks. (26)
- MIC ATT: For recording vocals or musical instruments with a microphone. Automatically lowers (attenuates) excessively high signal levels. (26)

17 ⏏ OPEN/CLOSE button
Press to open or close the cassette compartment. (20)

A


SONY
21
20
19
18
OPEN/CLOSE
START ID AUTO WRITE
SKIP ID WRITE
END ID WRITE
DISPLAY MODE
RENUMBER
ERASE
RMS CHECK
ENTER
REPEAT 1/ALL
TIME SEARCH
MARGIN RESET
CLEAR
MUSIC SCAN
SKIP PLAY
COUNTER MODE
RESET
MEMORY
DATE RECORDED
PRESENT
FADER
CD PLAYER
CD SYNCHRO
STOP
START
STANDBY
22
23
24
25
18

Location and Function of Controls

18 Tape operation buttons
- ■ (stop): Press to stop recording or playback.
- ► (play): Press to start playback or recording.
- ❚❚ PAUSE: Press to pause recording or playback. To restart recording or playback, press this button again or ►.
  If the unit stays in pause mode for about 10 minutes, the mode is automatically released and the unit stops. To restart recording or playback, press ● REC or ►, respectively.
- |◁◁ / ▷▷| (AMS): Press to locate the beginning of a selection while the unit is playing or stopped. (57)
- ◀◀ / ▶▶ (rewind/review, fast-forward/cue): Press while the unit is stopped to rewind or fast-forward the tape.
  Press during playback to rewind or fast-forward the tape while monitoring the sound.
- ○ REC MUTE (record muting): Inserts a silent portion (space). (32)
- ● REC (recording): Press to enter recording pause. Then press ❚❚ PAUSE or ► to start recording.

19 PHONES (headphones) jack
Connect headphones to this jack.

20 PHONE LEVEL control
Turn to adjust the headphones volume. (54)

21 TIMER switch
Normally set to OFF. Set to REC or PLAY to record or play back at a specific time using an optional audio timer. (68)

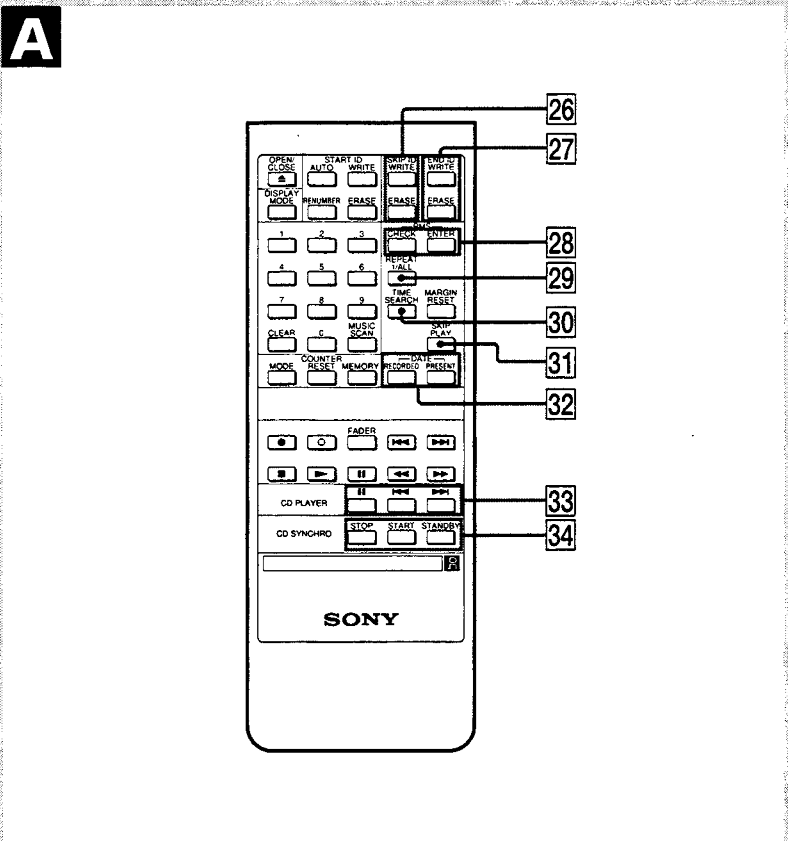
22 DISPLAY MODE button
Press to select a complete display, partial display, or no display. (10)

23 Numeric buttons (0-9) and CLEAR button
Use the numeric buttons to specify the program number of the selection to be played back or the starting program number of a sequence during recording.
Press CLEAR to erase a program number just entered. (58,62,67)

24 MUSIC SCAN button
Press to listen to the beginning of each selection successively. (65)

25 FADER button
Press for fade-in or fade-out during recording or playback. (34,63)

Location and Function of Controls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26
27
28
29
30
31
32
33
34
OPEN/ CLOSE
START ID
AUTO
WRITE
SKIP ID WRITE
END ID WRITE
DISPLAY MODE
RENUMBER
ERASE
ERASE
ERASE
1
2
3
RMS
CHECK
ENTER
REPEAT 1/ALL
4
5
6
7
8
9
TIME SEARCH
MARGIN RESET
CLEAR
C
MUSIC SCAN
SKIP PLAY
MODE
COUNTER RESET
MEMORY
DATE
RECORDED
PRESENT
FADER
CD PLAYER
CD SYNCHRO
STOP
START
STANDBY
SONY

26 SKIP ID buttons
WRITE: Press at the start of a portion to be skipped later.
During playback, the portion from the skip ID to the next start ID is skipped. (48)
ERASE: Press to erase the nearest skip ID before the current position. (49)

27 END ID buttons
WRITE: Press to write an end ID signifying the end of playback or recording. (50)
ERASE: Press to erase an end ID. (52)

28 RMS* play buttons
ENTER: Press to enter a selection in a program for playback in sequential order. (67)
CHECK: Press to check the contents of a program. (67)
*RMS: Random Music Sensor

29 REPEAT 1/ALL button
Press to select the repeat play mode:
REPEAT 1 → REPEAT ALL → off (64)

30 TIME SEARCH button
Enter the time from the beginning of the tape with the numeric buttons, then press TIME SEARCH to locate the specified position. (61)

31 SKIP PLAY button
Press to activate the skip ID code function. Portions of a tape marked with a skip ID are skipped. (58)

32 DATE buttons
RECORDED: Press to display the recording date of the tape being played. (28)
PRESENT: Press to display the current time. (19)

33 CD operation buttons (35)
For use only in conjunction with a Sony CD player equipped with a remote commander.
❚❚ (pause): Press twice to start playback. Press once during playback to pause.
⏮ / ⏭ (AMS): Press to locate the start of specific selections on a CD.

34 CD SYNCHRO (CD synchronized recording) buttons (35)
Controls the playback of a Sony CD player equipped with a remote commander for synchronized recording with the DAT deck.
STANDBY: Press to place the unit in recording pause.
START: Press to start recording on the DAT deck and playback on the CD player.
STOP: Press to stop recording on the DAT deck and playback on the CD player.

Location and Function of Controls

Remote Commander Operation

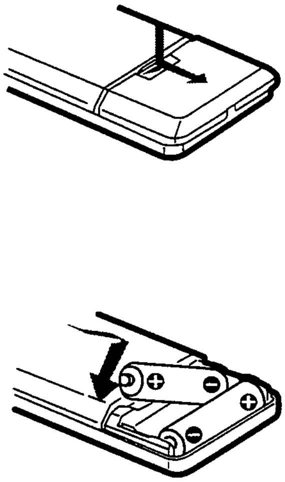
Each button on the remote commander functions in the same way as those on the front panel with the same name. The following operations, however, cannot be performed with the remote commander, and must be done on the front panel controls:

- Turning the power on and off
- Setting the INPUT switch
- Adjusting the recording level and balance
- Adjusting the headphones level
- Setting the TAPE/SOURCE switch
- Setting the TIMER switch
- Selecting the recording mode (standard or long)
- Turning SBM and emphasis functions on and off
- Setting the clock

The remote commander must be used for the following operations and functions:

- Synchronized recording with a Sony CD player
- Controlling pause and AMS functions on a Sony CD player
- Writing and erasing skip IDs and end IDs
- Repeat play
- Skip play
- RMS (Random Music Sensor) play
- Changing the display mode
- Adjusting the brightness of the display
- Time search function
- Fade-in/fade-out function
- Displaying the recording date or current time
- Music scan function

B



Insert two size-AA (R6) batteries with correct polarity, then close the lid.

Location and Function of Controls

Notes on the Remote Commander

- Do not expose the remote sensor on the deck to strong light such as direct sunlight and lighting equipment.
- Avoid obstructions between the remote commander and the remote sensor since they may prevent the reception of commands by the deck.
- Point the remote commander directly at the remote sensor on the deck.
- As the batteries weaken, the remote control distance will become shorter. Replace the batteries when this occurs.

Installing batteries B

To avoid battery leakage

When the commander will not be used for a long period of time, remove the batteries to avoid damage caused by battery leakage and corrosion.

Battery life

About half a year of normal operation can be expected when using Sony SUM-3 (NS) batteries.

Display Window

To turn off the display

When you turn on the unit, the display lights up. During recording or playback, you can specify a partial display or no display.
Using the remote commander, press DISPLAY MODE to change the display as follows:

Normal display ←
↓
Peak level meters and margin indicator turn off.
(The DISPLAY OFF indicator lights.)
↓
The entire display turns off during recording and playback*.
(The DISPLAY OFF AUTO indicator lights momentarily just before the display turns off.)

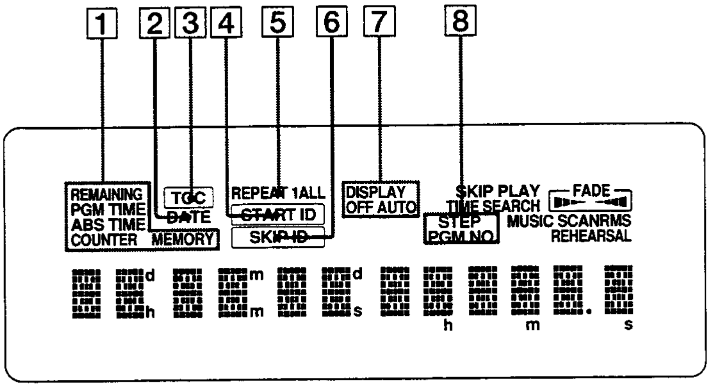
* If you press DISPLAY MODE when the unit is not recording or playing back, the DISPLAY OFF AUTO indicator lights and the entire display turns off immediately when you start recording or playback.

To adjust the brightness of the display

Hold down MODE and press numeric buttons 1, 2 or 3 on the remote commander. The higher the number, the darker the display becomes.

Location and Function of Controls

C


1
2
3
4
5
6
7
8
REMAINING
PGM TIME
ABS TIME
COUNTER
TOC
DATE
MEMORY
REPEAT 1ALL
START ID
SKIP ID
DISPLAY
OFF AUTO
SKIP PLAY
TIME SEARCH
STEP
PGM NO
FADE
MUSIC SCAN
RMS
REHEARSAL
d
h
m
m
d
s
h
m
s

Display Window (Left) C

1 REMAINING (remaining time): Lights when the counter shows the remaining time of the tape.
PGM TIME (program time): Lights when the counter shows the elapsed time of the current selection.
ABS TIME (absolute time) indicator: Lights when the counter shows the elapsed time from the beginning of the tape.
COUNTER: Lights when the counter shows the elapsed time from the start of the tape or from the position at which RESET was last pressed.
MEMORY: Lights with the COUNTER indication to indicate that the memory function is on.

2 DATE indicator
Lights when RECORDED is pressed to show the recording date of the tape being played. Flashes when PRESENT is pressed to show current time.

3 TOC (Table Of Contents) indicator
Lights when a pre-recorded DAT cassette is played.

4 START ID indicator
Flashes (for 9 or 18 seconds) when writing or erasing a start ID code, and lights when a start ID is detected during playback.

5 REPEAT indicators
REPEAT 1: Lights during repeat play of a single selection.
REPEAT ALL: Lights during repeat play of all selections.

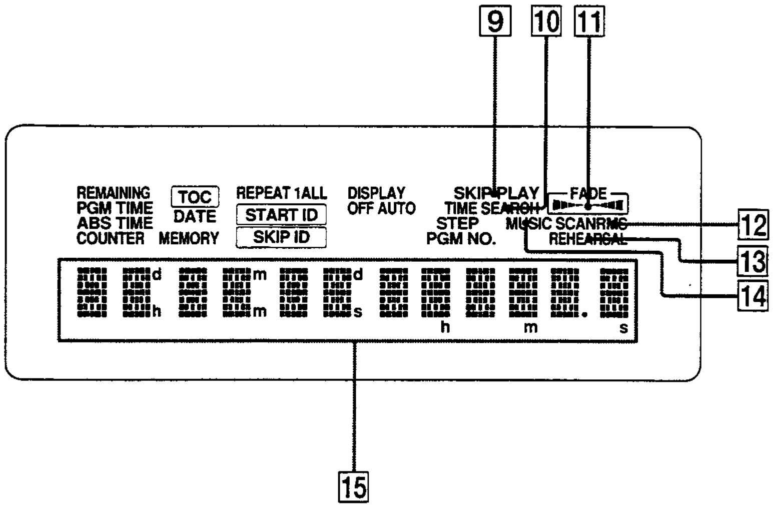
6 SKIP ID indicator
Lights (for 1 or 2 seconds) when writing or erasing a skip ID code or when a skip ID is detected during playback.

7 DISPLAY OFF AUTO indicator
Lights to indicate that the entire display will turn off at the start of recording or playback.

8 STEP/PGM NO. indicator
PGM NO. indicates the program number of the selection being played. When the RMS function is on (67), STEP appears to indicate the playing order of programmed selection.

Location and Function of Controls

C


9
10
11
REMAINING
PGM TIME
ABS TIME
COUNTER
TOC
DATE
MEMORY
REPEAT 1ALL
START ID
SKIP ID
DISPLAY
OFF AUTO
SKIP PLAY
TIME SEARCH
STEP
PGM NO.
FADE
MUSIC SCAN
RMS
REHEARSAL
12
13
14
d
h
m
m
d
s
h
m
s
15

[9] SKIP PLAY indicator
Lights during playback when a portion marked by a skip ID is being skipped .

[10] TIME SEARCH indicator
Lights when the time search function is on and the unit advances to the end of a specified (absolute) time from the start of the tape.

[11] FADE indicator
FADE -◂ıl : Flashes as recording or playback fades in.
FADE lı▸- : Flashes as recording of playback fades out.

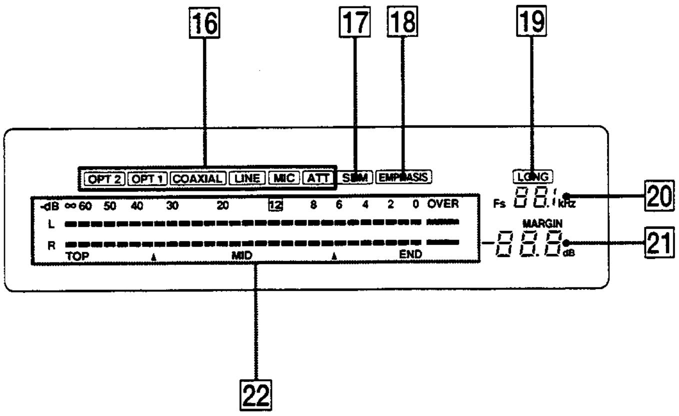
[12] RMS (Random Music Sensor) indicator
Lights when the RMS function is on. (67)
Specified program numbers appear on the display.

[13] REHEARSAL indicator
Lights when the rehearsal function is on. (42,48,51) Fine adjustments made to start, skip and end ID settings appear on the display in units of 0.3 second.

[14] MUSIC SCAN indicator
Light as the music scan function plays the beginning of all selections in succession.

[15] Time indicator
Indicates the tape running time, absolute time, elapsed time of the current selection, or remaining time. The displayed item changes each time you press MODE.

D


16
17
18
19
OPT 2
OPT 1
COAXIAL
LINE
MIC
ATT
SBM
EMPHASIS
LONG
-dB ∞ 60 50 40 30 20 12 8 6 4 2 0 OVER
L
R
TOP
MID
END
Fs 88.1 kHz
MARGIN
-88.8 dB
20
21
22

Display Window (Right) D

16 INPUT selector indicators
Lights to indicate the input signal currently selected by the INPUT selector switch.

17 SBM indicator
Lights when the SBM function is on (applicable during analog recording only).

18 EMPHASIS indicator
Lights when the emphasis function is on (during recording or playback).

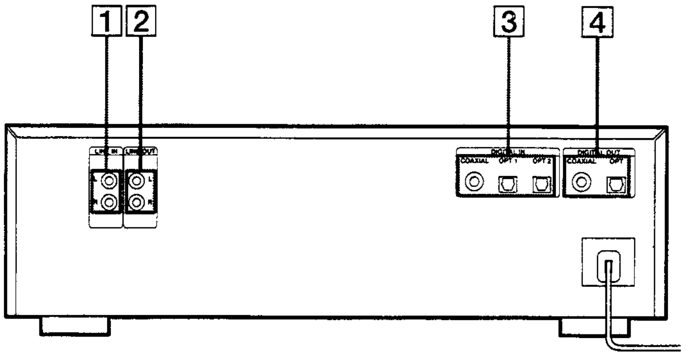
19 LONG play mode indicator
Lights during recording or playback in long-play mode.

20 Sampling frequency indicator
48 kHz: Lights during recording or playback of analog input signals (standard mode).
44.1 kHz: Lights during recording or playback of a CD, MD, DCC or a pre-recorded DAT cassette tape.
32 kHz: Lights during recording or playback of analog input signals (long-play mode).

21 MARGIN indicator
Indicates the most recent margin between the peak input audio signal and 0 dB.

22 Peak level meters
Indicate the signal level during playback and recording for the left and right channels. A peak hold function holds the indication at peak level momentarily.

A



Connections

See below and the facing page for an explanation of the DTC-2000ES's analog and digital jacks. See pages 16 and 17 for system connection examples.

Rear Panel Jacks A

1 LINE IN (line input) jacks (phono jack)
Connect to the recording outputs of an amplifier. Signals supplied by the amplifier can be recorded at a sampling frequency of 48 kHz or 44.1 kHz in standard-play mode, or 32 kHz in long-play mode.

2 LINE OUT (line output) jacks (phono jack)
Connect to the DAT or tape inputs of an amplifier to output the playback signal of the DTC-2000ES.

3 COAXIAL/OPT1/OPT2
DIGITAL IN (digital input) jacks (coaxial phono jack/optical jack)
Connect to the digital outputs of a digital source, such as a CD player, MD player, or another DAT recorder, for digital-to-digital recording. Then specify the input signal by selecting COAXIAL, OPT1, or OPT2 with the INPUT selector switch.

4 COAXIAL/OPT DIGITAL OUT (digital output) jacks (coaxial phono jack/optical jack)
Connect to the digital inputs of an amplifier with a built-in D/A converter, MD player, or another DAT deck, for sound reproduction from a DAT cassette or digital-to-digital recording.

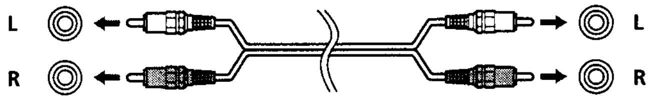
Notes on connection

- Use the connecting cords specified in the illustrations.
- Turn off power to all equipment before making connections (pages 16 and 17).
- Be sure to insert the plugs firmly into the jacks. Loose connections may cause hum and noise. When disconnecting a cord, grasp the plug and not the cord.

Note on stereo signals

Both channels (L/R) of a stereo signal are transmitted over a single optical cable connected to the DIGITAL IN or DIGITAL OUT jack.

B



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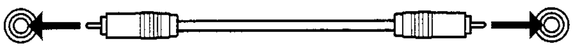
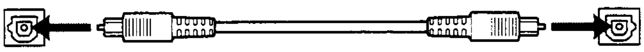
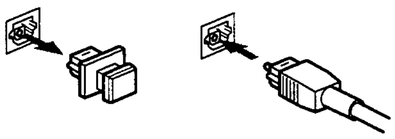


D



E



Connections

Connecting Cords

Three types of connecting jacks are provided at the rear of the deck, each requiring a different type of connecting cord.

LINE IN/OUT (analog input/ output) jack B

Uses the supplied connecting cords or optional audio connecting cord such as an RK-C510HG.

Note

Red connectors are for the right channel (R) and white connectors are for the left channel (L).

COAXIAL IN (digital input) jacks C

Uses an optional coaxial connecting cord such as a VMC-10HG.

OPTICAL IN/OUT (optical transmission digital input/ output) jacks D

Uses an optional optical cable such as a POC-15SP.

How to connect an optical cable E

Remove the projective cap from the jack and insert the optical cable plug firmly into the jack.

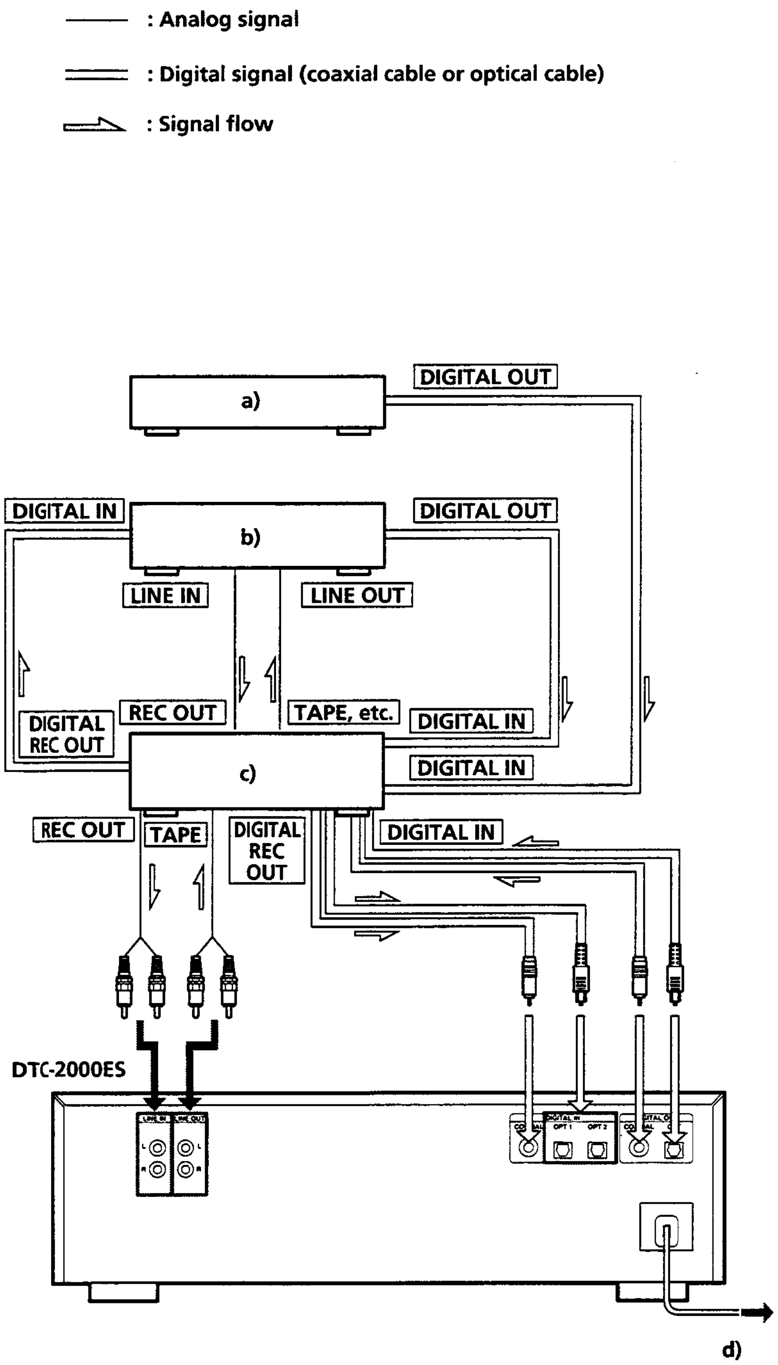
Notes on optical cables

- Do not bend the cable. When not using the cable, store it in a loop with a diameter of more than 15 cm (5 $^{7}/_{8}$ inches).
- Do not use optical cables under high-temperature conditions.
- When the optical cable is not connected, cover the OPTICAL IN/OUT jacks with the supplied caps.

Connections

Connection Examples

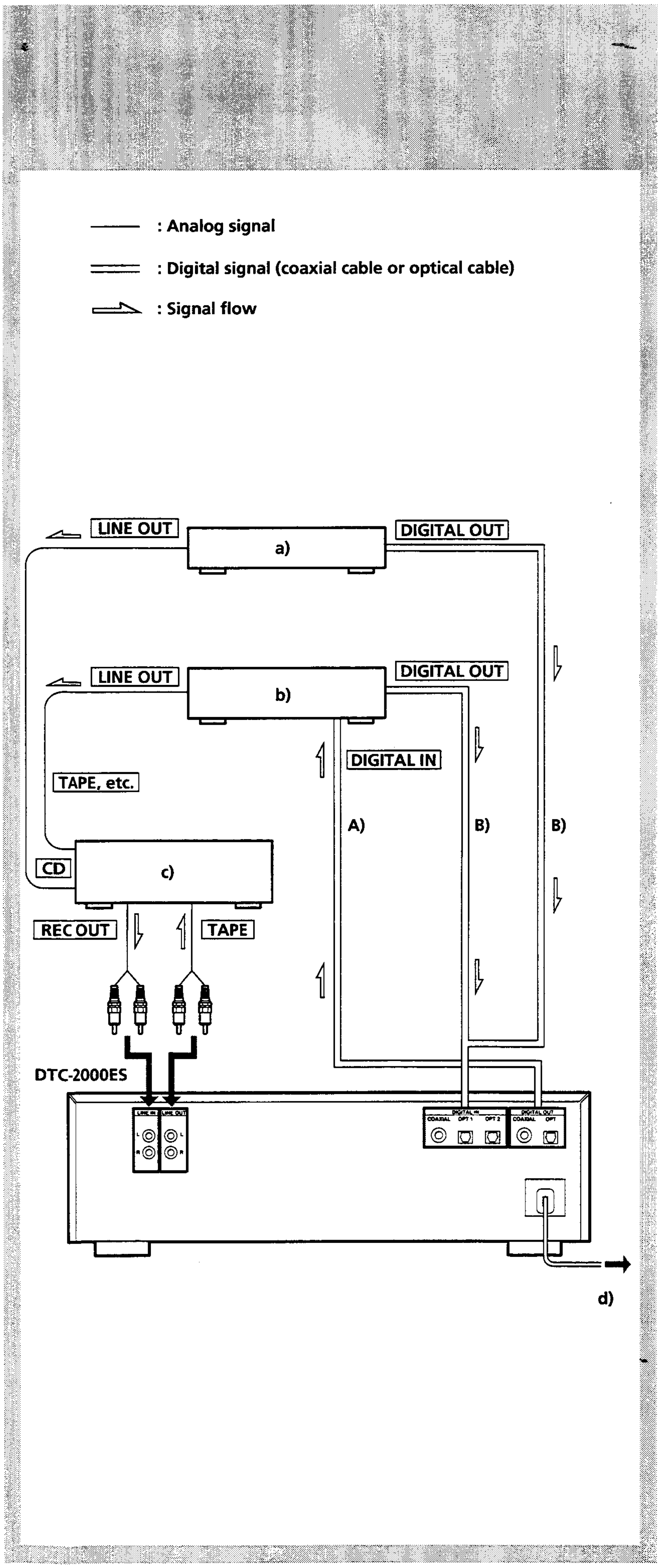
If your amplifier is equipped with digital signal jacks


: Analog signal
: Digital signal (coaxial cable or optical cable)
: Signal flow
DIGITAL OUT
a)
DIGITAL IN
b)
DIGITAL OUT
LINE IN
LINE OUT
DIGITAL REC OUT
REC OUT
TAPE, etc.
DIGITAL IN
c)
DIGITAL IN
REC OUT
TAPE
DIGITAL REC OUT
DIGITAL IN
DTC-2000ES
d)

a) CD player
b) DAT deck
c) Amplifier
d) to a wall outlet

Note
If "CANNOT COPY" appears on the display, digital recording cannot be performed. In this case, connect the analog output of the sound source to the LINE IN jacks of the DTC-2000ES to perform analog recording.

Connections


: Analog signal
: Digital signal (coaxial cable or optical cable)
: Signal flow
LINE OUT
a)
DIGITAL OUT
LINE OUT
b)
DIGITAL OUT
DIGITAL IN
TAPE, etc.
A)
B)
B)
CD
c)
REC OUT
TAPE
DTC-2000ES
d)

If your amplifier is not equipped with digital signal jacks

a) CD player
b) DAT deck
c) Amplifier
d) to a wall outlet

A) For digital-to-digital recording, connect the digital input of a DAT deck to DIGITAL OUT OPTICAL of the DTC-2000ES.

B) For digital-to-digital recording, connect the digital output of the sound source to DIGITAL IN (COAXIAL or OPTICAL) of the DTC-2000ES.

When connecting a microphone

Connect microphones with stereo mini-plugs to the MIC jacks on the front of the DTC-2000ES.

Note

If "CANNOT COPY" appears on the display, digital recording cannot be performed. In this case, connect the analog output of the sound source to the LINE IN jacks of the DTC-2000ES to perform analog recording.

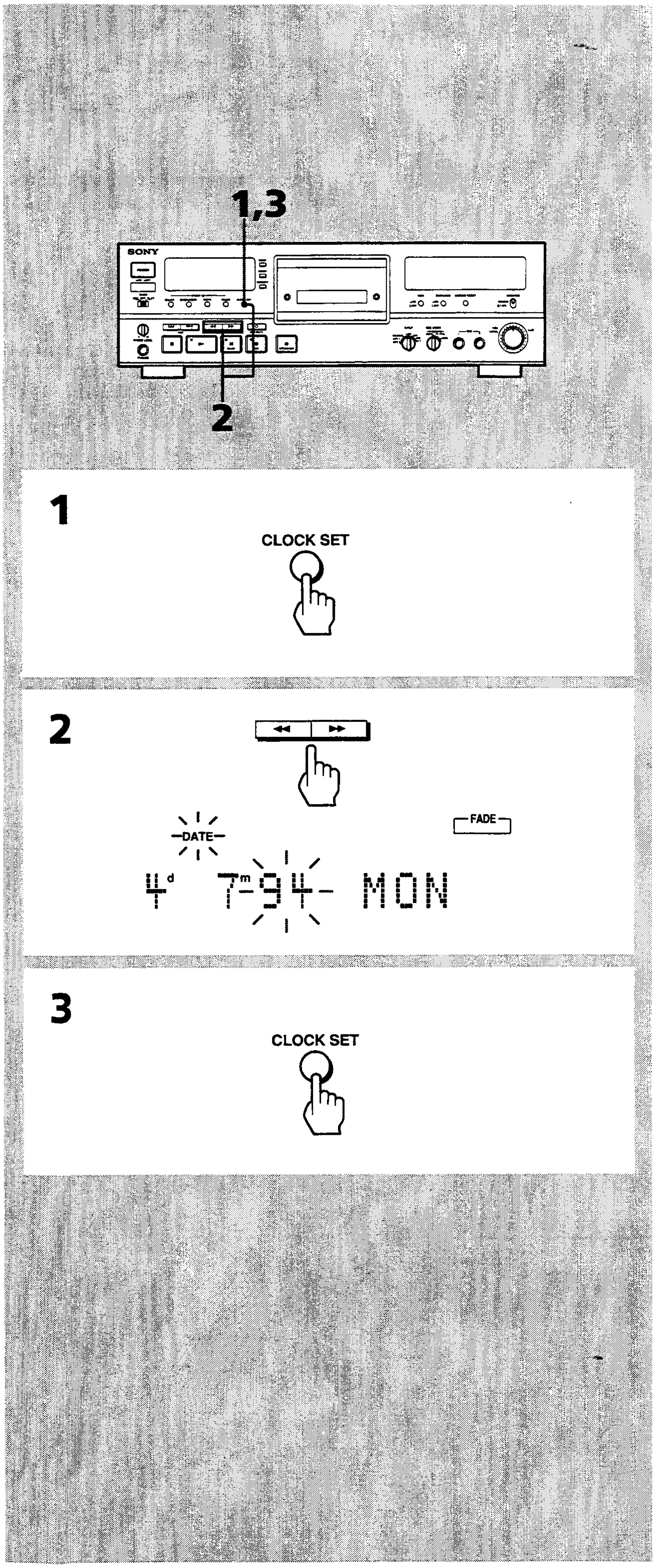
Clock Setting

This unit employs a built-in clock to keep track of the current date and time. Once you set the date and time, this information will be recorded on the tape along with the audio signal during recording, allowing you to check the recording date of the tape during playback at a later time.

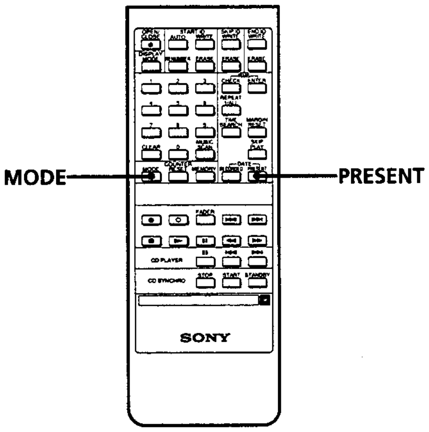
1. **Press CLOCK SET.**
   The year indication begins to flash.

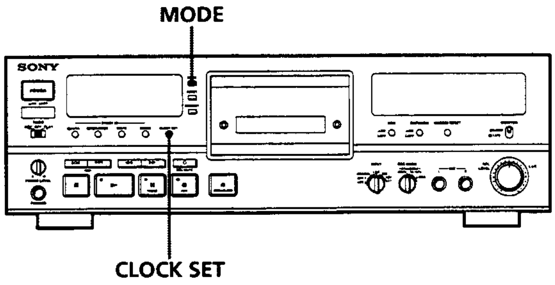
2. **Press ►► or ◄◄ to enter the year, month, day, hour and minute.**
   Pressing ►► increases the display value; pressing ◄◄ decreases the value.
   To move to the next item, press CLOCK SET. The day of the week is automatically calculated for any year from 1987 to 2086.

3. **After making all settings, press CLOCK SET in synchronization with a time signal.**



Clock Setting





To view the date or time

Press PRESENT to display the date or time. Press MODE to return to the counter display.

To reset the time

Press PRESENT until the time appears, then do steps 1 to 3 on the previous page to reset the time.

Time display

The time is displayed in a 12-hour format. Midnight and noon are displayed as follows:
Midnight: 12:00 AM
Noon: 12:00 PM

Built-in clock

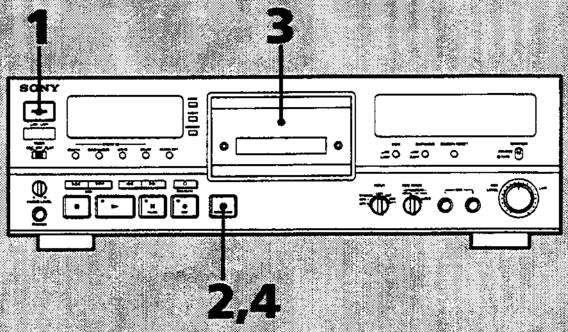
This unit's built-in clock uses a quartz oscillator, and is thus susceptible to time variations caused by changes in temperature and other conditions. For precise time stamping, it is recommended that you set the clock once a week.

Precaution on setting the clock

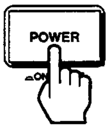
Although this unit's clock automatically adjusts for leap years and long and short months, do not enter a date which does not exist.

Notes

- Pressing CLOCK SET for the first time after purchasing the unit causes "–d–m–" to appear. Do steps 2 and 3 on the previous page to set the clock.
- Set the clock while the tape is stopped.
- This unit uses a back-up battery to keep the clock running when the power is turned off. The life of the battery under normal use is approximately seven years. When the battery starts to run down, the clock will stop operating normally. When this occurs, have the battery replaced at your dealer or nearest Sony Service Center (a battery replacement fee is required).



1



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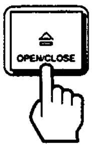
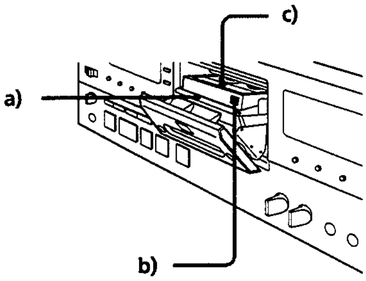
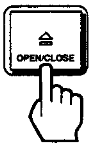


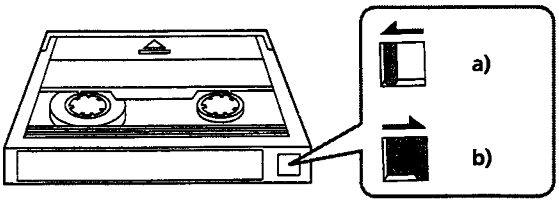
3



4



A



Cassette Loading

1 Turn on the power.

2 Press ⏏ OPEN/CLOSE.

3 Insert the cassette.
a) Insert past the silver bar.
b) Tab facing out.
c) Window side up.

4 Press ⏏ OPEN/CLOSE.
Do not push the lid **with your hand.**

To remove the cassette

Press ⏏ OPEN/CLOSE.
The cassette cannot be removed during recording, record-muting, or recording of a start ID.

Regarding digital audio tapes

This unit uses only digital audio tape made especially for DAT decks. Unlike conventional analog audio cassette tape, **digital audio tape is recorded on one side only.**

- Digital audio tape is enclosed in a dust resistant case. Do not attempt to open the case by force.
- The hole at the back of a tape is a detector slot. Do not cover this slot.
- If you use this tape (under 12µm), the unit may display inaccurate information.

Notes

- When you turn on the power, the **II** indicator flashes for a moment in the display window. During this period, no buttons other than ⏏ OPEN/CLOSE and ▶ are operative. Wait until flashing stops and the **II** indicator goes off.
- After inserting a cassette, do not push the cassette compartment with your hand. Always use ⏏ OPEN/CLOSE to close the compartment.

Regarding the sampling frequency

The sampling frequency (48 kHz, 44. 1 kHz or 32 kHz) of the source program appears in the display window during playback or recording on the unit.

To prevent accidental erasure A

To prevent accidental erasure of previously recorded material, slide the safety tab open as shown in the illustration. With the hole open, sub codes cannot be rewritten.
a) Recording is impossible (hole is open).
b) Recording is possible (hole is closed).

Before Recording

This section explains the treatment of silent portions in DAT. The relationship between silent portions and absolute time code distinguishes DAT tape from conventional analog tape.

Blank and Sound-Muted Sections

In DAT, silent portions consist of two types, as illustrated below: A "blank" sections which contain no recorded signal, and B "sound-muted" sections which contain a recorded signal which is inaudible. In conventional analog tapes, these sections are treated identically; in DAT, these two sections are clearly distinguished due to the recording of absolute time codes during DAT recording.

Blank section A

A section of tape with no signal recorded.

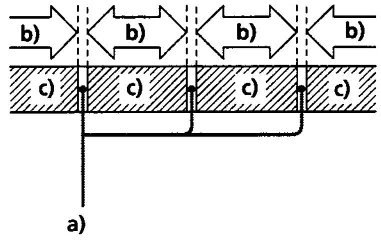
a) Blank section
b) Recorded section
c) Selection

Sound-muted section B

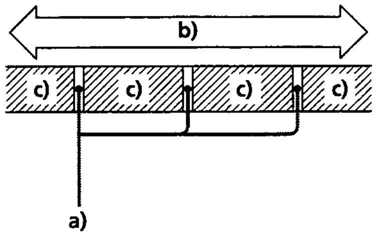
A section of tape with an inaudible signal recorded.

a) Sound-muted section
b) Recorded section
c) Selection

A



B



Before Recording

Absolute Time Codes

Absolute time codes are automatically and continuously recorded from the start of the tape whenever recording takes place, and are used to indicate the tape position and elapsed playing time. They are thus recorded even during sound-muted sections, but not during blank sections. Since blank sections break the continuity of the absolute time codes, they prevent the accurate measurement of tape position. You should thus avoid creating blank sections on the tape during DAT recording.

Recording absolute time codes

When recording to DAT tape, you can avoid creating blank sections by:

- Using the record muting function (see page 32) to insert a sound-muted portion between selections. Do not advance the tape with the ▶▶ or ▶ button.
- Using the end search function (see page 33) to find the end of existing material in order to continue recording.

Notes

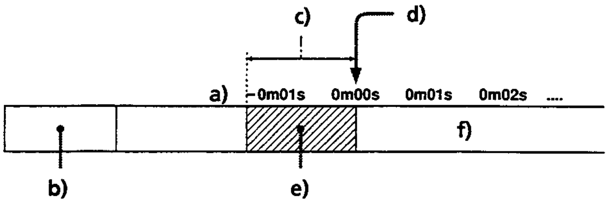
- If the continuity of the time codes is broken by a blank section, absolute time codes will not be recorded during later recording operations.
- Once written, absolute time codes cannot be rewritten.

Lead-In Area C

When you insert a new cassette tape into the DAT deck, the unit detects the leader tape portion, then automatically creates a lead-in area (see Fig. C). "BB" lights up for about 1 second in the left display window at this time.

The lead-in area can be inadvertently erased by another DAT recorder when you start recording from the beginning of the tape by pressing ● REC while the cassette lid is open. To prevent erasure of the lead-in area, press ⏏ OPEN/CLOSE to close the cassette lid before starting recording.

C



a) Absolute time indication
b) Leader tape
c) "BB" appears under PGM NO.
d) Recording starting point
e) Lead-in area
f) Selection

SBM (Super Bit Mapping) and Emphasis Functions

Super Bit Mapping

During analog recording, the SBM function lowers noise within the frequency band to which to the human ear is most receptive to noise, thereby, sharply expanding the auditory dynamic range of the recorded signal.
To activate the function, turn on the SBM switch when recording an analog source through the analog (LINE IN) connectors. The SBM indicator lights up in the right display window.

High-precision pulse A/D converter

The DAT deck uses a pulse A/D converter and decimation filter to convert an analog signal into a quantized 24-bit digital signal. DAT, like CDs, uses 16-bit quantization, and thus the 8-bit difference results in more precise quantization, more signal information and less quantizing noise than16-bit quantization. During conversion of the 24-bit data to a 16-bit DAT recording signal, the SBM function boosts sound quality by reintegrating into the 16-bit signal 4 bits of signal information that have been till now lost.

Applying the principle of human hearing

The SBM function applies the principle of human hearing in the reintegration of signal information. The auditory range of the human ear is generally considered to be 20 Hz to 20 kHz; hearing sensitivity, however, shows greater sensitivity to the range between 3 kHz and 4 kHz, and lower sensitivity to frequencies above and below this range (see Fig. A). This principle applies also to quantizing noise as well. By reducing quantizing noise in this particular range, signals can be recorded to produce more expansive sound than is possible by a uniform reduction of noise over the entire audible range.

A

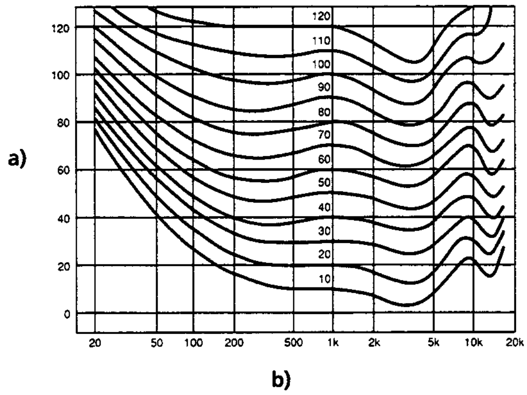
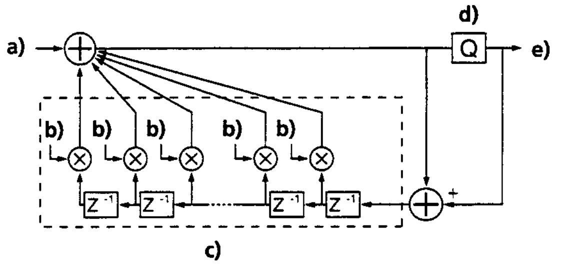
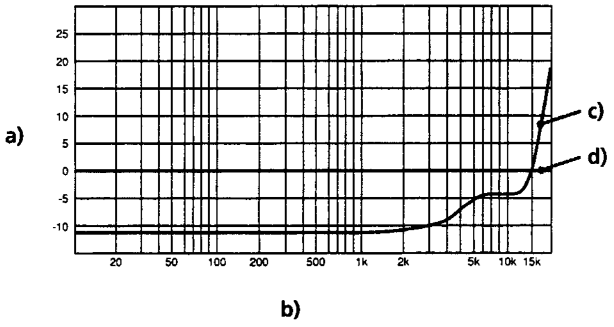


Fig. A
a) Sound pressure level (dB)
b) Sampling frequency (Hz)

B



C



SBM (Super Bit Mapping) and Emphasis Functions

Noise-shaping filter

The SBM function uses a noise-shaping filter (see Fig. **B**) with a frequency response similar to that of the human ear to reduce quantizing noise within the most sensitive frequency range, and to feed back the quantizing error (that is normally lost) back to the input signal, re-integrating the low-end bit information with the high-end bit information (see Fig. **B**).

Fig. B

a) 24-bit information input
b) Coefficient
c) Noise-shaping filter
d) Quantizer
e) 16-bit SBM output

Fig. **C** shows the improvement in the quantizing noise level when the SBM switch is on. Given a noise level of 0 dB when the SBM switch is off, the improvement in noise level for sampling frequencies lower than 3 kHz exceeds 10 dB when the SBM is activated.

Fig. C

a) Noise level (dB)
b) Sampling frequency (Hz)
c) SBM ON
d) SBM OFF

The SBM function operates only during recording. The improved sound produced by the SBM function, however, can be enjoyed during playback, regardless of the SBM switch position or the DAT deck being used.

SBM (Super Bit Mapping) and Emphasis Functions

Emphasis Processing

Emphasis processing takes advantage of the fact that most sounds in nature are low-frequency sound. By emphasizing high-bandwidth signals during analog recording (pre-emphasis), then lowering the emphasized signals during playback (de-emphasis), high-bandwidth noise is significantly reduced (see Fig. D).

D

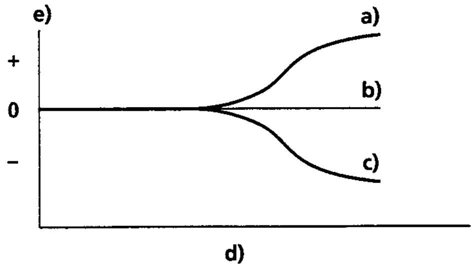
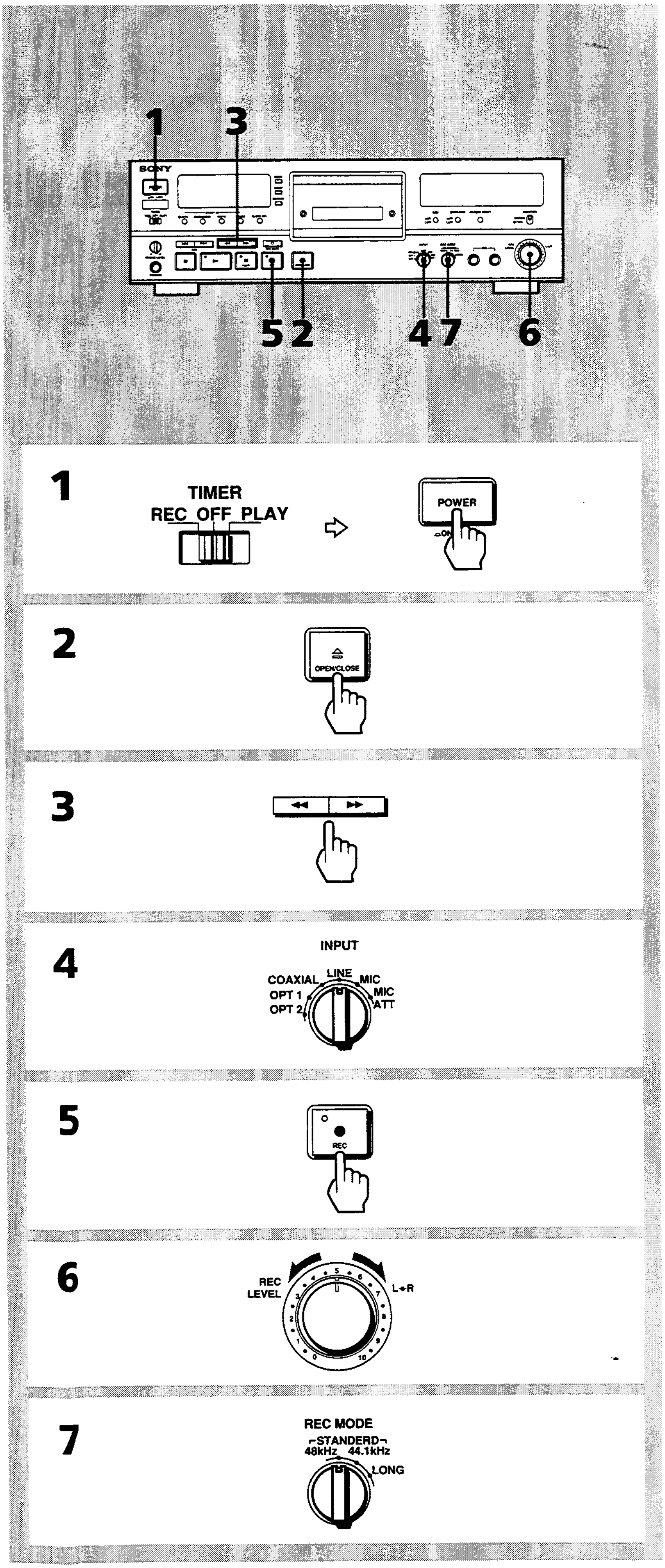


Fig. D

a) Pre-emphasis (during recording)
b) Emphasis off
c) De-emphasis (during playback)
d) Sampling frequency
e) Level

Press EMPHASIS ON/OFF to turn the emphasis function on, use the monitoring function to compare the recorded sound with emphasis on and off, then set the switch according to your preference. You should, however, adjust the recording level only after setting the EMPHASIS switch since the recording level is slightly changed by the setting.
The emphasis function automatically turns on during playback of tapes recorded with emphasis. Tapes recorded with emphasis can also be played back on other DAT decks.

Recording



1 **After making sure that the TIMER switch is set to OFF, turn on the power.**

2 **Insert a cassette and press ≙ OPEN/CLOSE to load the cassette (see page 20).**

3 **Locate the starting position for recording.**
To start recording from the beginning of the tape, press ◀◀ to rewind to the beginning. After the tape has rewound, "TOP" appears when you press ◀◀ again.
To go to the end of previously recorded material, see "End Search" on page 33.

4 **Set the INPUT selector to LINE, OPT1/2, COAXIAL or MIC/MIC ATT, depending on your sound source.**

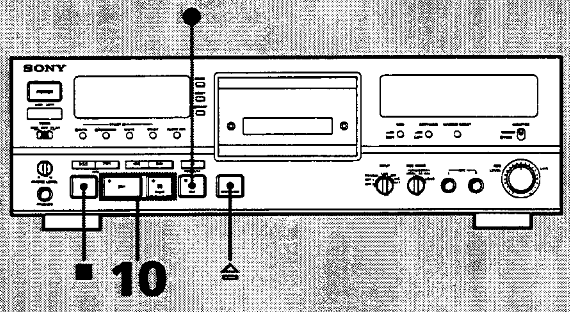
5 **Press ● REC.**
The ●, ▶ and ❚❚ indicators light on the display, and the deck changes to recording pause.

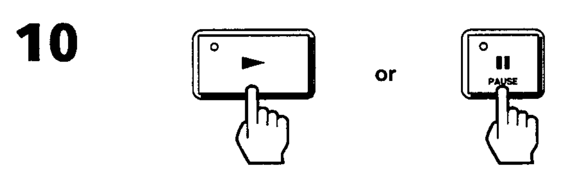
Note on recording from the beginning of the tape
If you begin recording directly after rewinding to the beginning of the tape, the beginning part of the first selection may be skipped during later playback with the AMS function. To avoid this, use the record muting function (see page 32) to add a 4-second sound-muted section at the beginning of the tape.

6 **When recording an analog signal, adjust the recording level and balance with the respective REC LEVEL controls (see page 30).**
No recording level adjustment is required when recording a digital signal.

7 **Set the REC MODE selector.**
When recording in standard mode, set REC MODE to STANDARD 48 kHz or STANDARD 44.1 KHZ.
When recording in long-play mode, set REC MODE to LONG.

8 **To write start IDs automatically during recording, make sure that the START ID AUTO indicator is lit.**
If not, press START ID AUTO (see page 39).





Recording

9 To specify a program number, press the respective numeric button (see page 45).
If you record from the beginning of the tape, the program number is automatically set to 1. Program numbers are written to the same position as start IDs.

10 Press ❚❚ PAUSE or ►.
The ❚❚ indicator goes off, and recording starts.

To stop recording

Press ■.

To pause recording

Press ❚❚ PAUSE.
If you press ○ REC MUTE, the deck enters recording pause.

To release pause and resume recording

Press ❚❚ PAUSE or ►.

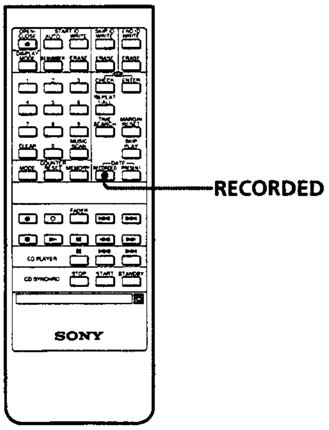
Note on ⏏ OPEN/CLOSE
⏏ OPEN/CLOSE does not function during recording or record muting. To remove the tape, press ■ to stop recording before pressing ⏏ OPEN/CLOSE.

If the input signal contains a prohibit signal
"CANNOT COPY" appears, indicating that recording of the source is not possible with a digital-to-digital connection. In this case, use an analog-to-analog connection to perform analog recording.

Interruption of the input signal during digital recording
If signal input stops during digital recording (due to disconnection of the input cable or the ending of the broadcast, etc.), "OPT1/2" or "COAXIAL" flashes in the right display window, "DIN UNLOCK" appears in the left display window, and the unit changes to recording pause. If the input signal resumes within the next 10 minutes, recording pause is automatically canceled and the unit begins recording again.

If recording pause continues for more than 10 minutes
Recording pause is automatically canceled and the unit stops. If this occurs, you must press ● REC again if you wish to resume recording.

Recording



If a recording cannot be made

- The safety tab of the cassette is open (recording is impossible) (see page 20).
- No cassette is loaded.
- The INPUT selector switch is set to an incorrect position.
- The tape has finished.
- The output level of the signal source is too low.
- The input signal contains a prohibit signal ("CANNOT COPY" appears on the display).
- The recording level is set at 0 (during analog recording).

Note on the INPUT and the REC MODE selectors

Do not change the setting of these selectors after recording starts. If you do, the wrong "PGM TIME" information may appear in the display window.

Note on the SBM and the EMPHASIS switches

To obtain uniform characteristics in the recorded sound, do not change the setting of the SBM and EMPHASIS switches after recording starts.

If the cassette is ejected after loading

Make sure that the cassette is inserted correctly (see page 20).

When the tape finishes

The tape rewinds to the beginning and stops (auto rewind function).
The auto rewind function does not function when the TIMER switch is set at REC.

Accuracy of the electronic linear counter

The linear counter provided with this unit is not a clock, and thus the indicated time may differ slightly from the actual elapsed recording or playing time.

Date Stamping

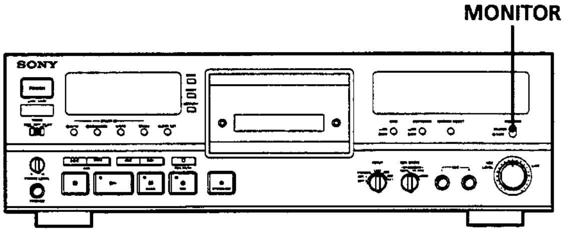
If you have set the built-in clock, the date and time of all recordings are automatically recorded on the tape. To see the recording date of a selection, press RECORDED on the remote commander during playback. (See "Viewing the Recording Date" on page 59.)

Note

Date stamp information may be erased when you record new sub-codes to the tape (i.e., when using the renumbering function) on a different DAT deck.

Recording

Monitoring the Recorded Sound



This unit provides a MONITOR switch that allows you to listen to the source signal (SOURCE setting) and the recorded sound (TAPE setting) in order to compare the quality of the two signals during recording. If your amplifier has a monitor switch, set it to TAPE to use the unit's monitoring function.

To listen to the input source signal, set the MONITOR switch to SOURCE.
To listen to the sound recorded on the tape, set the MONITOR switch to TAPE.

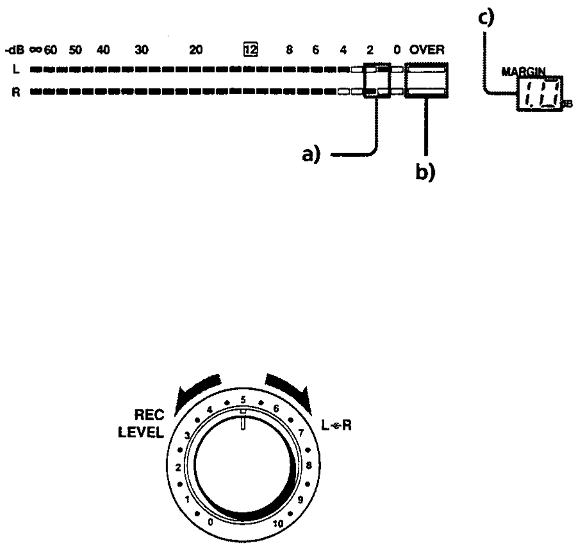
MONITOR setting and the corresponding output signal

Operating status	Switch setting	Indicator	Corresponding output signal
Recording	SOURCE	SOURCE	The source signal
	TAPE	TAPE	The recorded sound
Playback	SOURCE	TAPE	The recorded sound. (The source signal when unit is stopped)
	TAPE	TAPE	The recorded sound. (No sound when unit is stopped)
Stopped	SOURCE	SOURCE	The source signal
	TAPE	TAPE	No sound

Notes

- The recorded sound is output during playback regardless of the MONITOR switch setting.
- When switching between the source signal and tape using the MONITOR switch, sound output of the recorded sound will be slower than that of the source signal.
- You may not hear the source signal if you set the MONITOR switch to SOURCE while:
  - — the unit is rewinding or fast forwarding.
  - — the unit is recording a start ID, skip ID or end ID.
  - — the renumbering function is operating.

A



Recording

Recording Level Adjustment (for Analog Input Signals Only) A

During peak level meter operation, a peak hold function momentarily pauses the indicators at peak level to allow easier viewing. The MARGIN indicator shows the difference in decibels between the peak level and the 0-dB point. As the peak level is constantly changing, only the highest peak level (and lowest margin) is displayed at any time.
During recording, adjust the REC LEVEL controls so that the peak level stays between the 12-dB point and the 0-dB point to prevent distortion. When the level exceeds 0 dB, the "OVER" segments light up red.

To reset the margin indication

Press MARGIN RESET. The indication changes to "- -".

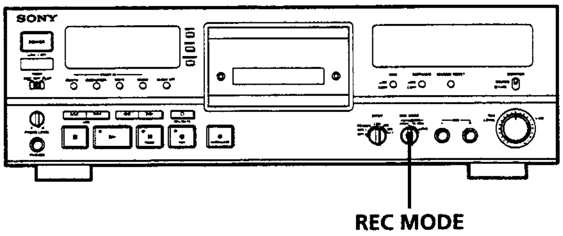
Adjusting the recording level during recording pause

Recording pause can be maintained for up to 10 minutes, after which it is automatically canceled and the unit stops. You can, however, continue to adjust the recording level even if the unit is stopped or no tape is loaded. To record, press ● REC again.

Fig. A

a) Peak Level
b) Sould no light.
c) Margin

B



Recording

Recording Mode B

The following table shows the recording mode for the various input signals and REC MODE selector settings.

Input signal	REC MODE selector position	Recording mode
Analog input signal	STANDARD (48 kHz)	Standard play (48 kHz)
	STANDARD (44.1 kHz)	Standard play (44.1 kHz)
	LONG	Long play (32 kHz)
Digital input signal (32 kHz)	STANDARD (48 kHz)	Standard play (32 kHz)
	STANDARD (44.1 kHz)	
	LONG	Long play (32 kHz)
Digital input signal (44.1 kHz)	STANDARD (48 kHz)	Standard play (44.1 kHz)
	STANDARD (44.1 kHz)	
	LONG	
Digital input signal (48 kHz)	STANDARD (48 kHz)	Standard play (48 kHz)
	STANDARD (41.1 kHz)	
	LONG	

( ): sampling frequency

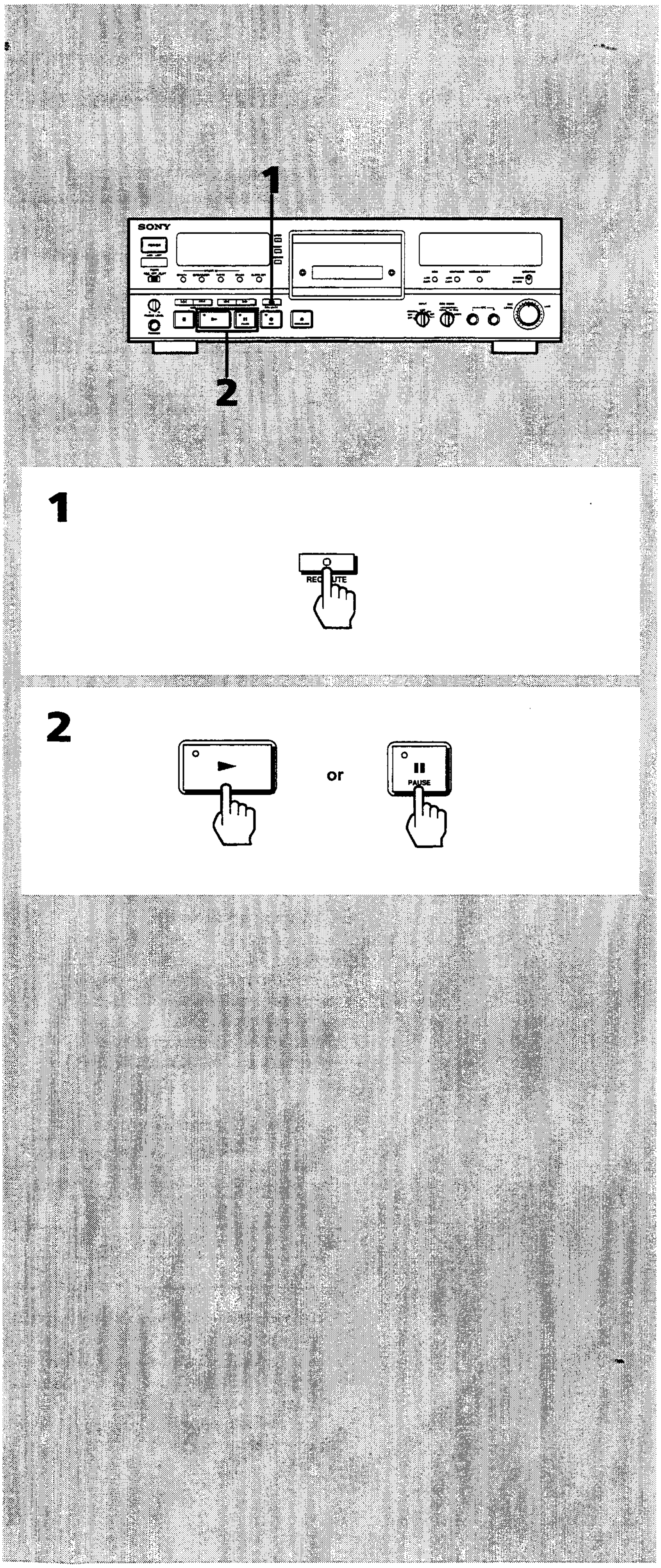
Note
Digital input signals with a sampling frequency of 44.1 kHz or 48 kHz are recorded only in standard mode and at their original sampling frequencies, regardless of the REC MODE selector setting.

Recording time

Cassette	REC MODE setting	
	Standard	Long
DT-120	2 hrs	4 hrs
DT-90	1 hr 30 min	3 hrs
DT-60	1 hr	2 hrs

Linear counter display during long-play mode

The linear counter shows the tape running time, absolute time and remaining time for standard mode only. To obtain the corresponding values for long-play mode, double each value.



Recording

Creating a Sound-Muted Section (Record Muting)

1 While the unit is recording or in recording pause, press ○ REC MUTE at the position of the sound muted section to be created.
The ● REC indicator starts flashing. During this time, no incoming signals are recorded on the tape. After about four seconds, the ● REC indicator stays lit, the II PAUSE indicator lights up and the unit changes to recording pause.

2 To resume recording, press II PAUSE or ►.
Recording resumes.

Sound-muted sections and the AMS function

The AMS function is designed to detect start IDs on DAT decks and blank spaces between selections on conventional analog cassette decks. If you intend to dub a DAT cassette to an analog cassette, use the record muting function to insert sound-muted sections between selections to allow the AMS function to function correctly during playback on an analog cassette deck.
Never use the ►► or ► button to insert a blank section as this will interrupt the recording of absolute time codes on the DAT cassette (see page 21).

To create a sound-muted section of more than 4 seconds

Hold down ○ REC MUTE for as long as the required. After about 4 seconds, the ● REC indicator begins flashing rapidly. When you release ○ REC MUTE, the unit changes to recording pause.

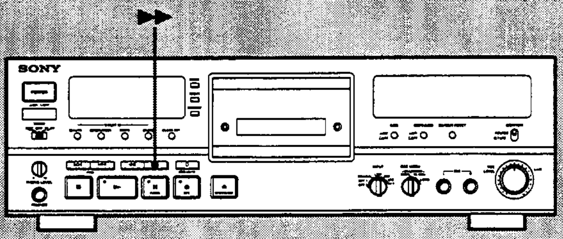
To create a sound-muted portion of less than 4 seconds

Press ○ REC MUTE, then II PAUSE while the ● REC indicator is flashing.

To start recording while in record-muting mode

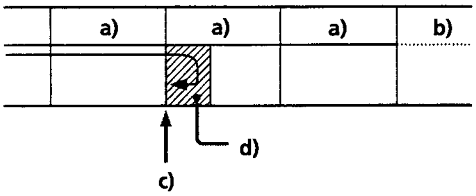
Press ● REC while the ● REC indicator is flashing.

Recording



C

D



End search

The end search function advances the tape to the end of previously recorded material to allow you to continue recording without interrupting the recording of absolute time codes.

To activate the end search function C

Press ▶▶ while the unit is stopped.

The tape advances, then stops at the end of the existing material or when an end ID is detected. If an end ID is detected, "EE" flashes under the PGM. NO indicator. The end ID is automatically erased when recording starts.

To add a sound-muted section from this point, press ○ REC MUTE (see page 32).

Note

An end search cannot start within a blank section (i.e., a section without absolute time codes).

If an end ID is positioned before the end of the existing material

The end search stops at the beginning of the end ID, as shown in figure D .

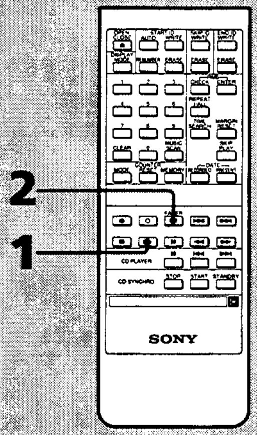
Fig. D

a) Selection
b) Blank
c) Position where end search stops
d) End ID

Detection of blank sections during an end search

The end search stops directly before any blank section greater than 9 seconds in length.

If the cassette is new, the end search continues until the end of the tape.



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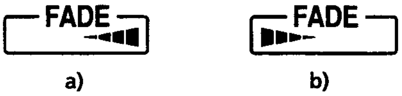

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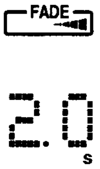


Recording

Fade-In/Fade-Out Recording (Remote Commander Operation Only)

Fade-in recording

1 **Press ● REC of the front panel or ● of the remote commander at the starting point of recording.**
The unit changes to recording pause.

2 **Press FADER at the point where you want to start fading in.**
The ◄◄▮ indicator flashes, and the sound being recorded fades in.

Fade-out recording

Press FADER at the point where you want to start fading out.
The ▮►► indicator flashes, and the sound being recorded fades out.
The counter will begin counting down and the unit changes to recording pause when 0.0s is reached.

Fig. E
a) Fade-in indicator
b) Fade-out indicator

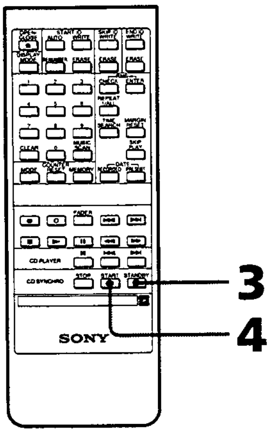
Specifying the fade-in/fade-out duration

You can specify a fade-in or fade-out duration of up to 15 seconds (the factory setting is 5 seconds). Specifications remain valid until next changed, even if the unit is turned off.

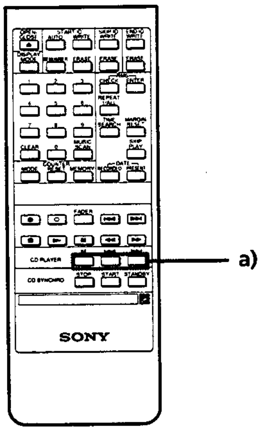
1 **Press FADER while the unit is stopped to choose ▮►► or ◄◄▮.**

2 **Keep pressing ◄◄ or ►► to select the duration (see Fig. F).**
Each press changes the duration in the following intervals:
1.0 to 3.0 sec in 0.2 sec intervals
3.0 to 5.0 sec in 0.4 sec intervals
5.0 to 15 sec in 1 sec intervals

G



H



Recording

CD Synchronized Recording (Remote Commander Operation Only)

If you use a Sony compact disc player with a remote commander you can start playback on the CD player and recording on the DAT deck simultaneously with the remote commander of the DAT deck.
To do this, the remote commander so that the signal reaches the remote sensor of both the DAT deck and the CD player.

To start CD synchronized recording (see Fig. G)

1 Insert a cassette into the DAT deck.

2 Insert the disc into the CD player.

3 Press STANDBY.
The DAT deck changes to recording pause.

4 Press START.
Recording on the DAT deck starts, and about 1 second later, playback on the CD player starts.

To stop recording

Press STOP.

Notes

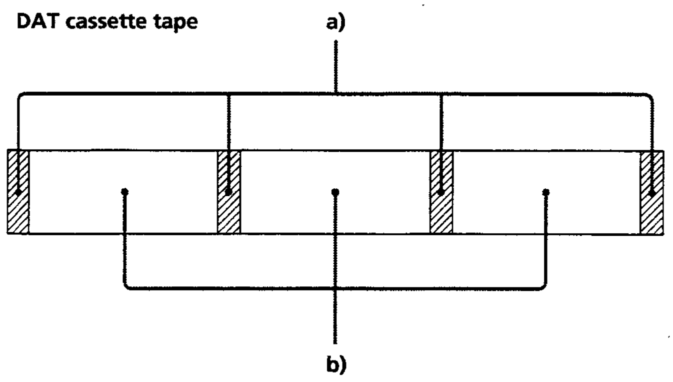
- To pause recording on the DAT deck and playback on the CD player at the same time, press ❚❚ on both the DAT deck and the CD player.
- If your CD player has a fast start up time, it may begin playing before recording starts on the deck. To prevent this, skip step 4, and press PLAY or PAUSE on the DAT deck in step 4, then the play button on the CD player 2 or 3 seconds later.

Using the remote commander of the DAT deck to control the CD player (see Fig. H)

a) CD operating buttons

CD function	DAT remote commander operation
Playback	Press ❚❚ twice.
Pause	Press ❚❚ once.
AMS	Press ❙◀◀ or ▶▶❙.

A



Sub-Codes

Sub-codes are control codes that are recorded with the audio signal on the DAT cassette tape to provide information about selections, facilitate access to specific selections, and allow easy editing of tape contents. Sub-codes include start, skip and end IDs, program numbers, absolute time codes, and date codes. (see Fig. **A**)

a) Sub-codes

b) Audio signal

Sub-code characteristics

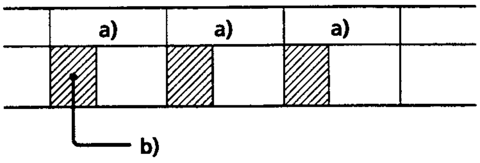
- Sub-codes are written separately from the audio signal on the tape, and therefore do not interfere with sound reproduction.
- Sub-codes can be rewritten (with the exception of absolute time codes) without affecting the recorded audio signal.
- When dubbing a DAT cassette with sub-codes to another DAT cassette through a digital-to-digital connection, sub-codes are as follows:

Sub-code	Recording status
Start IDs	Original codes are recorded as is.
Skip IDs	Original codes are recorded as is.
Program numbers	New codes are written.
Absolute time	New codes are written.
End IDs	Codes are not copied.
Date codes	Codes are not copied.

Note

During analog-to-analog recording, new sub-codes are written by the DAT deck being used. Sub-codes on the original tape are not recorded.

B



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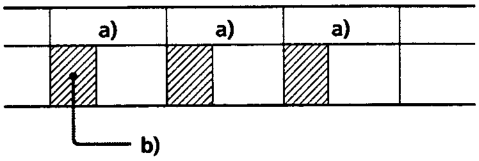

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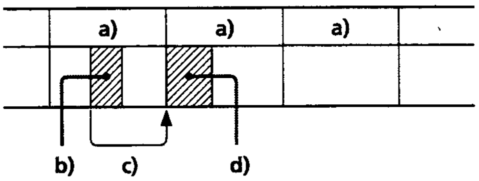

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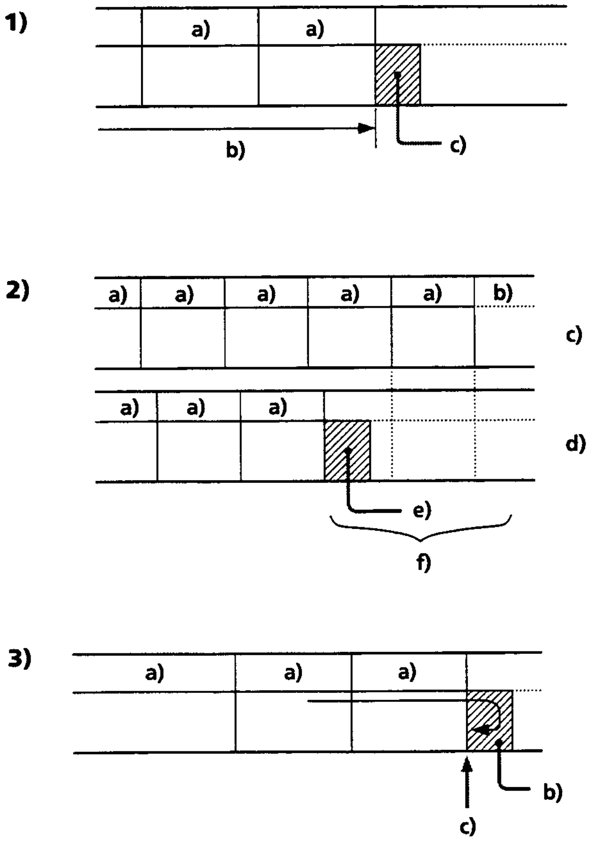


Sub-Codes

Start ID B

This sub-code indicates the start of a selection, allowing precise cueing to specific selections.

a) Selection
b) Start ID

Program number C

This sub-code assigns a number to a given selection. By entering the program number, you can play a selection directly or in a specified order.

a) Selection
b) Program number

Skip ID D

This sub-code specifies that a certain selection (or tape portion) is to be skipped. When the unit detects a skip ID, it fast forwards until it reaches the next start ID.

a) Selection
b) Skip ID
c) Skip to the next start ID.
d) Start ID

End ID E

This sub-code indicates the end of the recorded material on a tape.

1)

a) Selection
b) When an end ID is detected during playback, the tape automatically rewinds to the beginning.
c) End ID

2)

By writing an end ID after recording new material, you can quickly locate the end of the recorded portion the next time you want to record.

a) Selection
b) Blank
c) Recorded portion
d) When recording new material onto the same tape
e) End ID
f) Unrecorded portion

3)

The unit stops at the beginning of an end ID when it is detected during:

- a search for a specific selections
- rehearsal playback of a start or skip ID (see page 51)

a) Selection
b) End ID
c) The position at which the tape stops

Sub-Codes

Absolute time

The absolute time allows you to monitor tape position according to the elapsed playing time from the beginning of the tape. Absolute time codes are recorded automatically during audio recording, and cannot be rewritten.

Program time

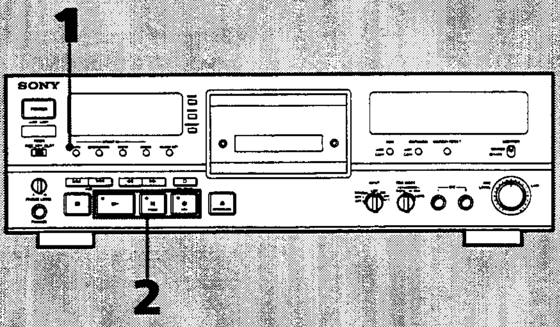
The program time indicates the elapsed playing time of the current selection.

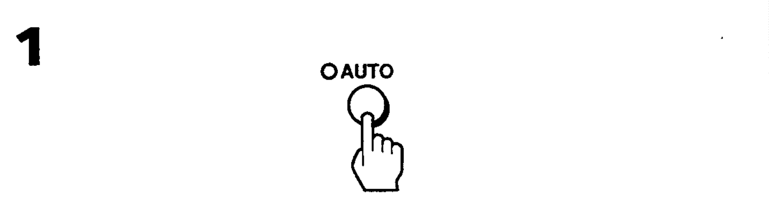
Date stamping function

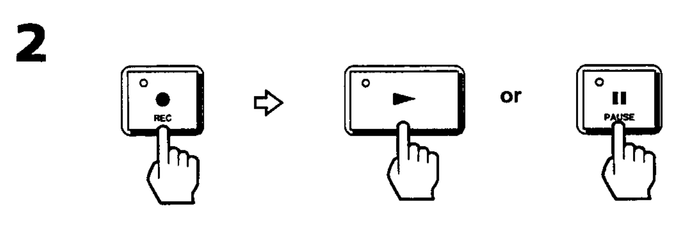
The year, month, date, day of the week, hour, minute, and second of each recording are automatically recorded on the tape.

Sub-code functions

Function	Corresponding sub-code(s)
Locating a selection (AMS function)	Start ID
Choosing a selection directly	Start ID/ Program number
Listening to the first portion of selections sequentially (music scan)	Start ID
Playing selections in a specified order (RMS play)	Start ID/ Program number
Skipping specific portions	Skip ID/Start ID
Cueing by time specification (time search)	Absolute time codes
Locating the end of recorded or playback material	End ID
Viewing the recording date	Date function (recording date is automatically recorded)







Start IDs

Start IDs indicate the beginning of selections, and thus enable fast cueing to specific selections (see page 57).
You can write a start ID in the following three ways:

- Automatically during recording
- Manually during recording
- Manually during playback

Automatic Writing of Start IDs During Recording

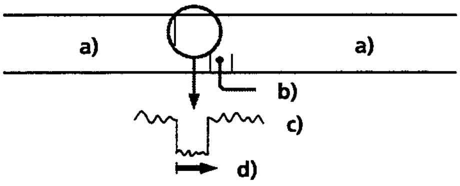
1 Make sure that the AUTO indicator is lit. If it is not, press START ID AUTO.
When you turn on the unit and load a record-enabled cassette (with safety tab closed), the AUTO indicator lights automatically. In the case of timer-activated recording, the AUTO indicator status prior to the activation of the timer determines if start IDs are automatically recorded when timer-activated recording begins.

2 To start recording, press ● REC, then press II PAUSE or ►.
If a sound-muted section of at least 3 seconds is followed by the audio signal, the unit automatically begins writing a start ID. A program number, if specified, is also written at the same time as the start ID (see page 44). Start IDs have a standard duration of 9 seconds (18 seconds in long-play mode). While a start ID is being written, "START ID" flashes in the left display window.

Note
All buttons except ■ are inoperative during the writing of a start ID.

Why a 9-second (or 18-second) start ID necessary
The unit searches for a start ID at 200 times the normal tape speed. The duration of the start ID must therefore be long enough to allow detection by the unit. After detecting a start ID, the unit begins playback from the beginning of the start ID.

A



Start IDs

• Notes on recording analog and non-CD/DAT digital sources

If a selection contains a sound-muted section or low-level-signal section of more than 3 seconds duration, the unit treats it as the beginning of a new track and writes a start ID. "START ID" flashes in the left display window at this time. Unnecessary start IDs may be erased at a later time (see page 43).

Operating principle of the AUTO function A

a) Selection
b) Start ID
c) Normal level
d) 3-second drop in signal level

* Use the INPUT selector switch to set the normal signal level as follows:

Setting	Signal level
MIC, MIC ATT	Approx -35 dB
LINE	Approx -45 dB
COAXIAL, OPT1, OPT2	Approx -50 dB

If the separation between selections is not clear, the unit may position the start ID slightly after the beginning of the selection. If this occurs, you may notice a slight loss of sound at the start of a selection after cueing. To correct the position of the start ID, use the position adjustment procedure on page 42.

Note

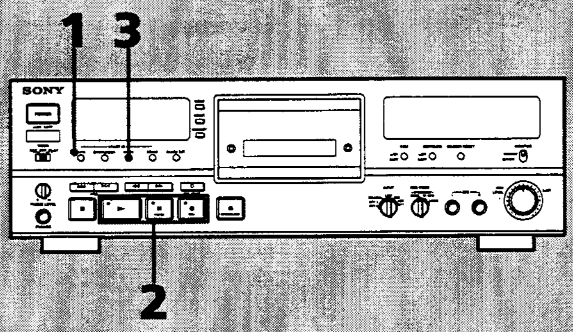
When recording an analog signal from an analog cassette deck or record player, hiss** or rumble*** noise may lead to inaccurate writing of start IDs. If this occurs, reposition or erase the start IDs after you have finished recording.

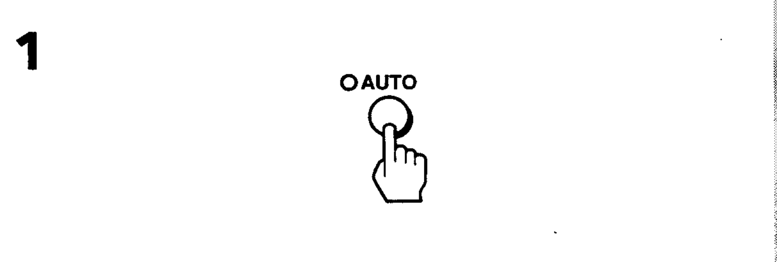
** Hiss noise: high-bandwidth noise peculiar to analog cassette tapes.

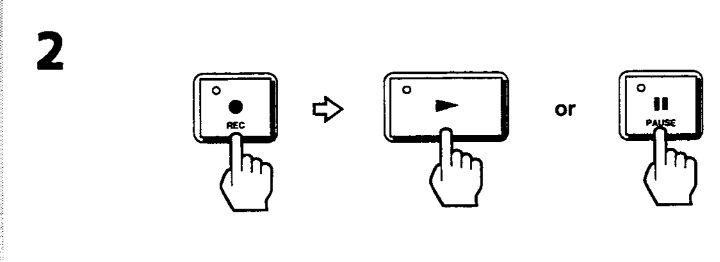
*** Rumble noise: low-bandwidth noise peculiar to analog record players.

• Note on recording from a CD or DAT

When recording from a CD or DAT tape through the DIGITAL IN connectors, the unit detects the starting point of each selection and writes start IDs automatically.







Start IDs

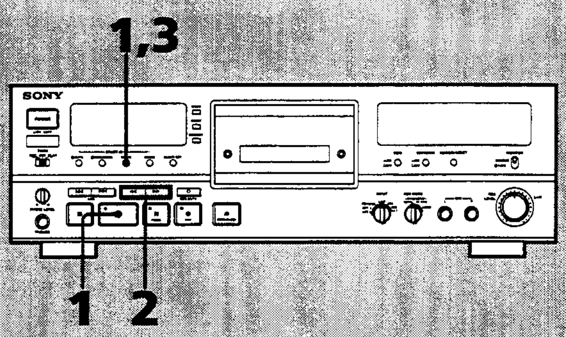
Manual Writing of Start IDs During Recording

1 Make sure that the AUTO indicator is off.
If not, press START ID AUTO to turn it off.

2 Press ● REC to start recording, then press II PAUSE or ►.

3 Press START ID WRITE at the position you want the start ID.
The unit writes a 9-second long start ID (18 seconds in long-play mode) from the point where you pressed START ID WRITE. "START ID" flashes while the start ID is being written.

Start IDs



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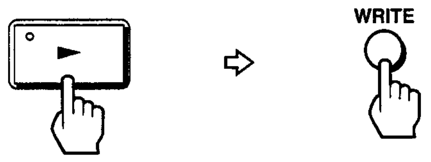

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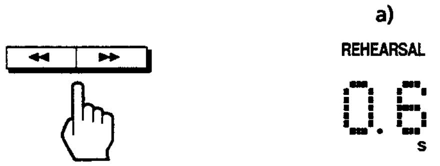

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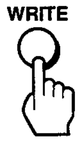

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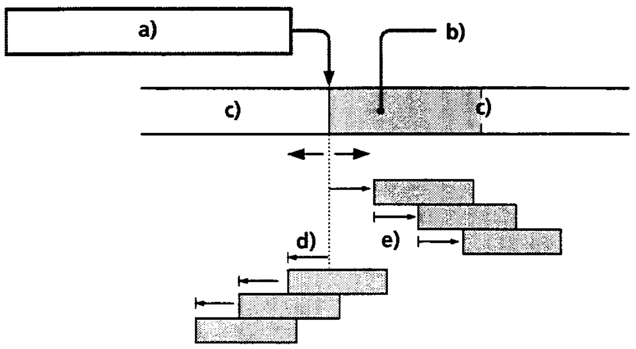


Manual Writing of Start IDs During Playback (Rehearsal Function)

The rehearsal function allows you to position a start ID more precisely. Before doing this procedure, make sure the safety tab on the inserted tape is closed to allow recording.

1 Press ► to start playback. Press START ID WRITE at the position you want a start ID.
The REHEARSAL indicator lights and the WRITE and START ID indicators flash. A start ID is written at that point and the next 3 seconds of recorded material begin playing back repeatedly (rehearsal play).

2 Press ◄◄ or ►► to reposition the start ID.
Each press of the button moves the start ID 0.3 second in the given direction. The distance moved appears under the MARGIN indicator, with the maximum range being 99 seconds from the original position.
a) Specified shift after pressing ►► twice.

3 After repositioning the start ID, press START ID WRITE again.
The start ID is written at the new position. No program number is written at this time.

Note
A separation of at least 18 seconds (36 seconds in long-play mode) must exist between any two start IDs to permit proper detection by the DAT deck.

Illustration of start ID movement during the rehearsal function A

At the completion of the rehearsal function, a new start ID is written at the beginning of the repeated portion.

a) Original position where START ID WRITE was pressed
b) Repeated portion (3 seconds)
c) Selection
d) 0.3 second shifts backward by pressing ◄◄
e) 0.3 second shifts forward by pressing ►►

During the normal course of the rehearsal function, the unit repeats the portion 16 times, then stops.

Start IDs

Repositioning a previously written start ID

Do the following procedure to reposition an existing start ID.

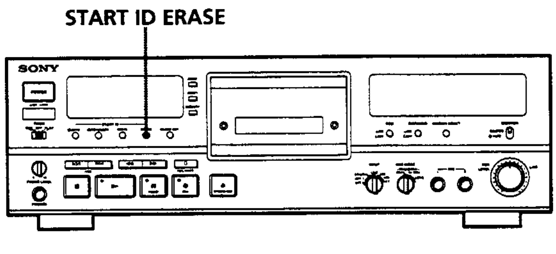
1. **During playback, press START ID WRITE at the position of the start ID to be moved.**
2. **Do steps 2 and 3 of "Manual writing of start IDs during playback" on page 42 to reposition the start ID.**
   Note that in the above procedure, you can shift the start ID only within a range of 2 seconds (4 seconds in long-play mode) from the original position. To move the start ID further than this, erase the start ID (see next section "Erasing a start ID"), then manually write a new one using the rehearsal function (see page 42).

Avoid positioning start IDs near the start or end of the tape

- A start ID positioned within 2 seconds of the beginning of the tape may be difficult to reposition* or erase on this unit or other Sony DAT units. For this reason you should use the record muting function (see page 32) to write a 4-second sound-muted section at the beginning of the tape before you start recording.
- Start IDs positioned within 10 seconds of the tape end may also be difficult to reposition, as well as renumber, and should thus be erased if possible.

* When a start ID is located close to the start of the tape, any attempt to move it closer using the rehearsal function will cause the MARGIN display to flash, indicating that further movement is impossible.

Erasing a Start ID



While the start ID to be erased is displayed, press START ID ERASE.
The start ID is erased.

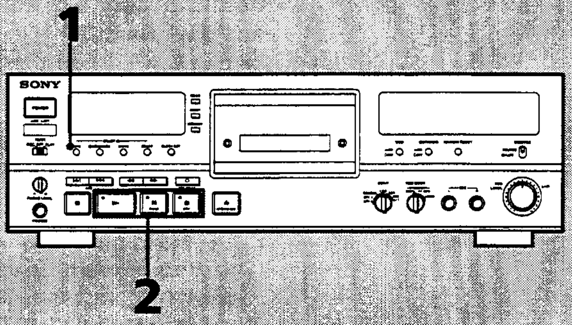
Note on program numbers
A program number accompanying a start ID is also erased at the same time as the start ID. Since program numbers following the erased number are unchanged, you should renumber them with the renumbering function on page 46.

Notes
- If you press START ID ERASE while the START ID indicator is off, the start ID right before the current position will be erased.
- Make sure the safety tab on the tape is closed to enable recording. If not, erasure of start IDs will be impossible.

Program Numbers

Program numbers place selections into sequential order, and provide the basis for a number of convenient playback functions such as the random music selection function (see page 67). Program numbers are written at the same time and position as start IDs. You can write program numbers in the following ways:

- Automatically during recording
- During automatic renumbering while the unit is playing or stopped (renumbering function).



Automatic Writing of Program Numbers During Recording

Writing program numbers from the beginning of the tape

1 Make sure that the AUTO indicator is lit. If it is not, press START ID AUTO.

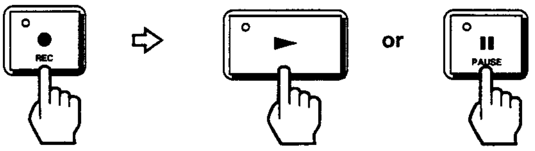
When you turn on the unit and load a record-enabled cassette (with safety tab closed), the AUTO indicator lights automatically. In the case of timer-activated recording, the AUTO indicator condition prior to the activation of the timer determines whether program numbers are automatically recorded when timer-activated recording begins.

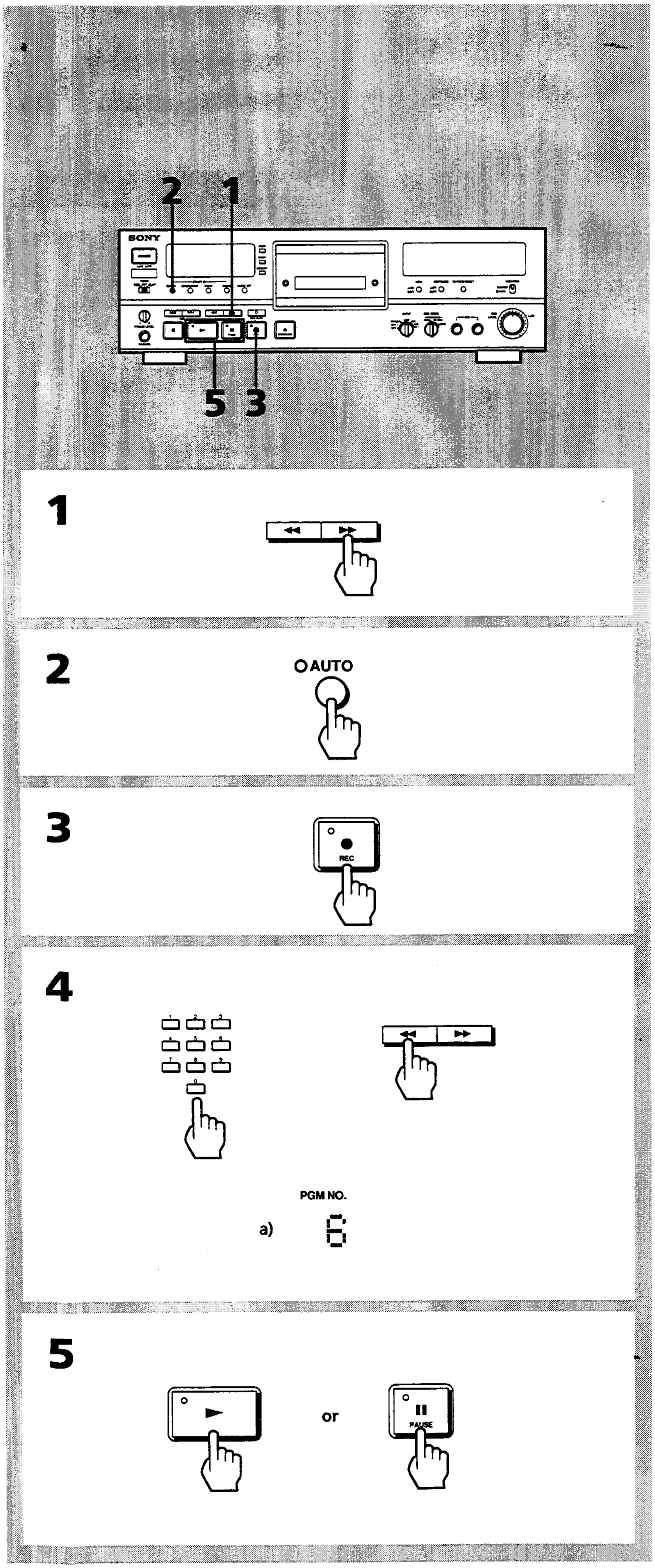
1

2 To start recording, press ● REC, then II PAUSE or ►.

Program numbers are written at the same time as start IDs (see page 39) in sequential order starting from 1. Program numbers have a standard duration of 9 seconds (18 seconds in long-play mode). While a program number is being written, "START ID" flashes in the left display window.

2





Program Numbers

Writing program numbers from the middle of the tape

1 Press ▶▶ (end search function) to locate the end of the existing material (see page 33).
This prevents the creation of a blank section.

2 Make sure that the AUTO indicator is lit. If it is not, press START ID AUTO.
When you turn on the unit and load a record-enabled cassette (with safety tab closed), the AUTO indicator lights automatically. In the case of timer-activated recording, the AUTO indicator condition prior to the activation of the timer determines whether program numbers are automatically recorded when timer-activated recording begins.

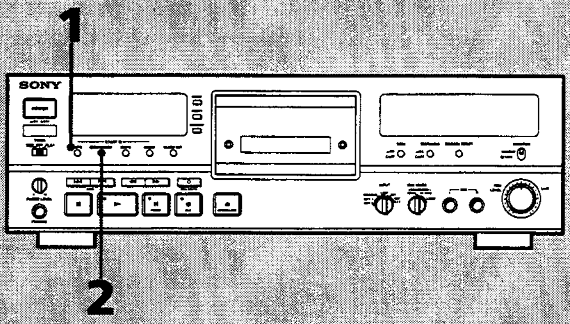
3 Press ● REC to change the unit to recording pause.

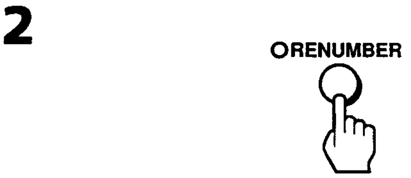
4 Continuing sequentially from the last program number, specify the next program number with the numeric buttons on the remote commander.
To check the last program number, press ◀◀. Then press ▶▶ (end search function) to go to the end of the existing material again.
If the last program number already appears under the PGM NO. indicator, you need not specify the next program number.
a) Next program number

If the next program number is not specified

Start IDs will be written, but not program numbers. You can, however, write program numbers using the renumbering function described on the next page.

5 Press II PAUSE or ▶.
The program numbers are written at the same position as start IDs and in consecutive order starting from the specified number.





Program Numbers

Renumbering

Renumbering program numbers automatically

The renumbering function renumbers all selections on a cassette at high speed. Use it to renumber tapes in which program numbers have been (1) duplicated during recording to previously recorded tape, or (2) disrupted by a failure to specify the next number.

1 **Make sure that the AUTO indicator is lit, and that the safety tab of the cassette is closed to enable recording.**
If the AUTO indicator is not lit, press START ID AUTO.

2 **Press RENUMBER when the unit is playing or stopped.**
The unit rewinds the tape to the beginning and begins renumbering the programs, starting with the first start ID. The START ID indicator flashes as the program number is being rewritten. After each successful writing operation, the RENUMBER indicator flashes as the unit fast forwards to the next start ID.

After renumbering has completed

The unit rewinds the tape to the beginning, then stops.

Note

The renumbering function may not operate properly in the following cases:

- A blank section exists on the tape.
- A new tape has been fast forwarded with the ► or ►► button.
- The separation between two start IDs is less than 9 seconds (18 seconds in long-play mode).

Program Numbers

Renumbering while shifting the position of start IDs and program numbers

If the sound-muted section before a selection is not clear, the start ID may be written slightly after the beginning of the selection, causing slight miscuing errors during AMS operation. If this occurs, you can use the following procedure to shift all start IDs on the tape backwards by 0.3 second (with the exception of the first program number). If a non-consecutive number is encountered during this process, the renumbering function is activated and the program numbers are renumbered.

1 **Make sure that the AUTO indicator is off, and that the safety tab of the cassette is closed to enable recording.**
If the AUTO indicator is lit, press START ID AUTO to turn it off.

2
ORENUMBER

2 **Press RENUMBER while the unit is playing or stopped.**
All start IDs and program numbers starting with the second selection are shifted 0.3 second towards the beginning of the tape.

Erasing Program Numbers

Make sure that the safety tab of the cassette is closed to enable recording.

During playback, press START ID ERASE while the program number to be erased appears on the display.
That program number is erased and the start ID at the same position is also erased. "START ID" flashes while the program number is being erased.

When a program number has been erased

Playback resumes. Since the program numbers after the erased number remain unchanged, you should use the renumbering function (see page 46) to renumber the tape.

Note
A start ID that is written within 10 seconds of the tape end may not be renumbered or shift properly, and should be erased if possible.

Skip IDs

A skip ID indicates the beginning of a portion to be skipped during playback. When the unit detects a skip ID, it fast forwards to the next start ID, then resumes playback (see "Skip Play" on page 58). You can write skip IDs during either recording or (for greater accuracy) playback. Both procedures can be performed only on the remote commander.

Writing Skip IDs During Recording

Press SKIP ID WRITE at the beginning of the portion to be skipped.
"SKIP ID" lights momentarily in the left display window.
The unit writes a 1-second skip ID (2 seconds in long-play mode) at the start of the portion.

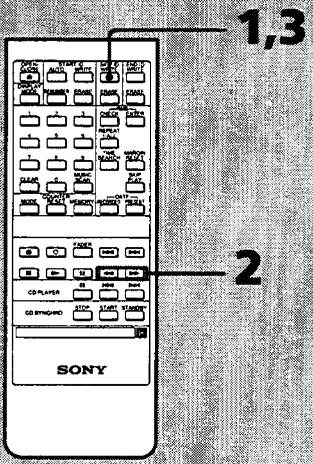
Writing Skip IDs During Playback (Rehearsal Function)

The rehearsal function allows you to position a skip ID more precisely during playback. Before doing this procedure, make sure the safety tab on the inserted tape is closed to allow recording.

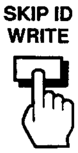
1 **During playback, press SKIP ID WRITE at the beginning of the portion to be skipped.**
The REHEARSAL indicator lights and 3 seconds of recorded material begin playing back repeatedly (rehearsal play). The end of the repeated portion corresponds with the beginning of the skip ID.

2 **Press ◀◀ or ▶▶ to reposition the skip ID.**
Each press of the button moves the skip ID 0.3 second in the given direction. The distance moved appears under the MARGIN indicator.
a) Specified shift after pressing ▶▶ twice.

3 **After repositioning the skip ID, press SKIP ID WRITE again.**
The SKIP ID indicator lights and the skip ID is written at the new position.



1



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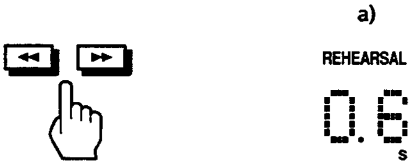
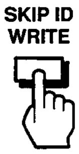


3



Skip IDs

A

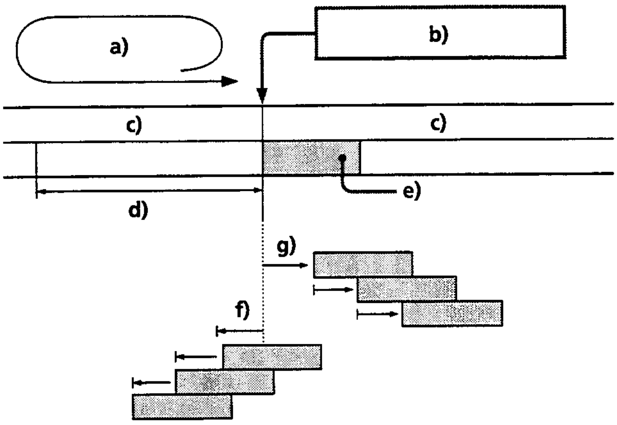


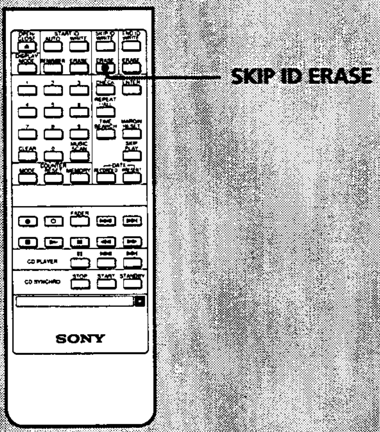
Illustration of skip ID movement during the rehearsal function A

At the completion of the rehearsal function, a new skip ID is written at the end of the repeated portion.

a) Repeated portion (3 seconds)
b) Original position where SKIP ID WRITE was pressed
c) Selection
d) 3 seconds
e) Skip ID (1 second)
f) 0.3 second shifts backward by pressing ◀◀
g) 0.3 second shifts forward by pressing ▶▶

During the normal course of the rehearsal function, the unit repeats the portion 16 times, then stops.

Erasing a Skip ID

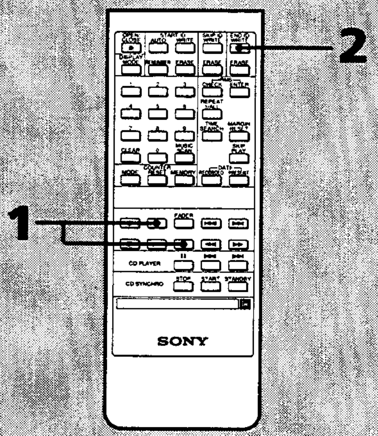


Make sure that the safety tab of the cassette is closed to enable recording.

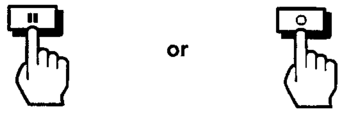
While the unit is playing or stopped, press SKIP ID ERASE immediately after the skip ID to be erased (immediately after the "SKIP ID" indicator appears).
The unit rewinds to the skip ID and erases it.

If a skip ID shares the same location as a start ID

Press START ID ERASE to erase both the start ID and skip ID together.
Press SKIP ID ERASE to erase the skip ID only, leaving the start ID intact.



1



2

END ID
WRITE

End IDs

An end ID indicates the end of the recorded material on a tape, allowing you to quickly cue the tape to record additional material. When the unit detects an end ID during playback, it stops, then rewinds to the start of the tape. You can write an end ID during either recording or (for greater accuracy) playback. Both procedures can be performed only on the remote commander.

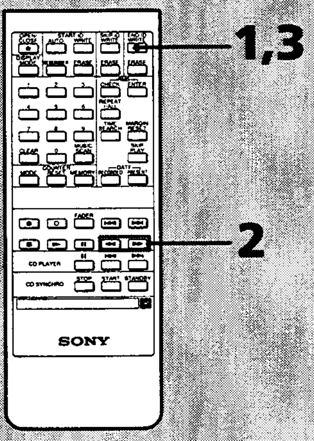
Writing an End ID During Recording

1 Press II PAUSE or O REC MUTE to stop recording.
Pressing **II** PAUSE changes the unit to recording pause.
Pressing O REC MUTE changes the unit to recording pause after a 4-second sound-muted portion is written.

2 Press END ID WRITE.
"EE" appears in the left display window and a 9-second end ID (18 seconds in long-play mode) is written. After writing the end ID, the unit rewinds to the beginning of the end ID.

After writing an end ID

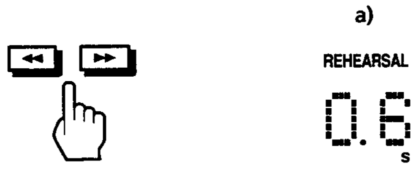
The unit will not be able to advance beyond the end ID, and any attempt to do so will cause "EE" to appear under the PGM NO. indicator. To advance the tape beyond this point, erase the end ID (see page 52).



1

END ID
WRITE

2



3

END ID
WRITE

End IDs

Writing an End ID During Playback (Rehearsal Function)

The rehearsal function allows you to position an end ID more precisely during playback. Before doing this procedure, make sure the safety tab on the inserted tape is closed to allow recording.

1 During playback, press END ID WRITE at the point where the end IDs to be written.
The REHEARSAL indicator lights and 3 seconds of recorded material begin playing back repeatedly (rehearsal play). The end of the repeated portion corresponds with the beginning of the end ID.

2 Press ◀◀ or ▶▶ to reposition the end ID.
Each press of the button moves the end ID 0.3 second in the given direction. The distance moved appears under the MARGIN indicator.
a) Specified shift after pressing ▶▶ twice.

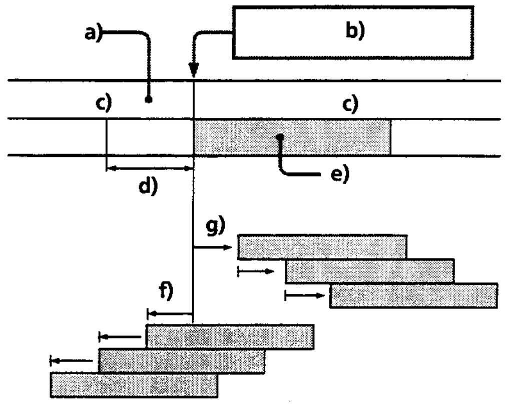
3 After repositioning the end ID, press END ID WRITE again.
The END ID indicator lights and the end ID is written at the new position.

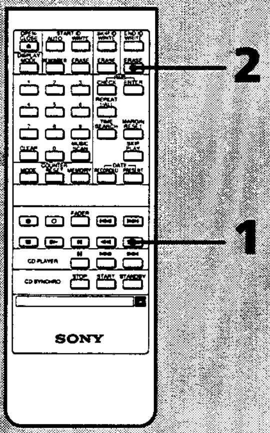
Notes

- End IDs cannot be written while playing back within a blank section.
- To write an end ID right before a blank section, press ▶▶ to activate the end search function. After the unit stops at the end of the existing material, press ● REC to change to recording pause, then WRITE END ID to write an end ID.

End IDs

A





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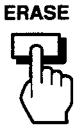


Illustration of end ID movement during the rehearsal function A

At the completion of the rehearsal function, a new end ID is written at the end of the 3-second repeated portion.

a) Repeated portion (3 seconds)
b) Original position where END ID WRITE was pressed
c) Selection
d) 3 seconds
e) End ID (9 seconds)
f) 0.3 second shifts backward by pressing ◀◀
g) 0.3 second shifts forward by pressing ▶▶

During the normal course of the rehearsal function, the unit repeats the portion 16 times, then stops.

Note

If you stop recording before the end of the tape, make sure to write an end ID where the recorded material stops.

Erasing an End ID

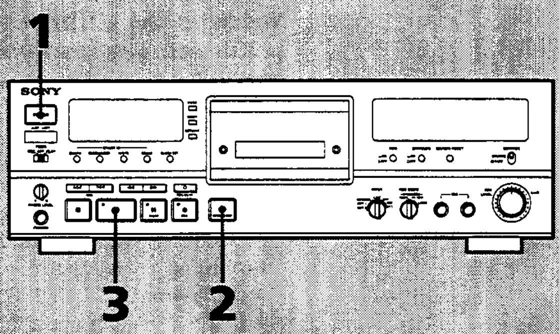
Make sure that the safety tab of the cassette is closed to enable recording.

1 **Press ▶▶ to go to the beginning of the end ID (see page 33).**
When the end ID is detected, the "EE" indicator lights.

2 **Press END ID ERASE.**
The end ID is erased.

Note

When you continue recording from an end ID, the end ID is automatically erased.



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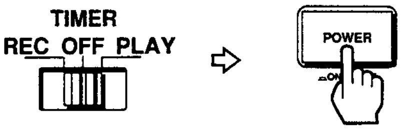
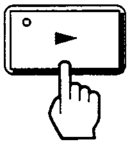


2

3



Playback

1 **Make sure that the TIMER switch is set to OFF, then turn on the power.**

2 **Insert a cassette and press ⏏ OPEN/CLOSE to load the cassette.**

3 **Press ►.**
Playback begins.
If an end ID or a blank section of more than 9 seconds is detected, playback stops, and the tape rewinds to the beginning.

To stop playback
Press ■.

To pause playback
Press ❚❚ PAUSE.

To release pause and restart playback
Press ❚❚ PAUSE or ►.

To fade out playback
Press FADER.

To rewind or fast-forward the tape
Stop the tape and press ◄◄ or ►►.

To remove the cassette
Press ⏏ OPEN/CLOSE.

To advance the tape while monitoring the tape sound (cue)*
Press ►► during playback.

To rewind the tape while monitoring the tape sound (review)*
Press ◄◄ during playback.

* During the cue and review functions, tape speed accelerates about 4 seconds after the button is pressed. Sound is output only while you press the button. Release the button to resume normal playback.

Playback

Notes on the MONITOR switch setting during sound monitoring

- Sound monitoring during playback is possible regardless of the MONITOR switch setting. After playback ends, however, the MONITOR switch automatically changes to SOURCE.
- No sound is output during the loading of a cassette, rewinding, fast-forwarding, or the writing of a start, skip or end ID, regardless of the MONITOR switch setting.

Adjusting the headphones volume
Use the PHONE LEVEL control.

When the tape finishes during playback
The tape automatically rewinds to the beginning and stops (auto-rewind function).

If tape noise exists, or the sound quality has deteriorated
The head may be dirty. Clean the head with a cleaning cassette (see page 69).

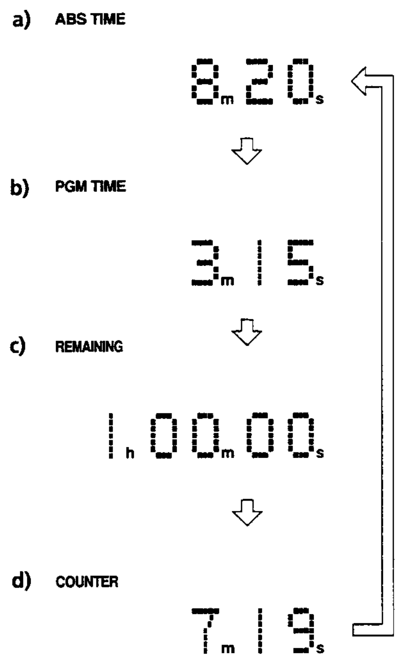
Note on the SBM indicator

During playback, the SBM indicator remains off, regardless of the SBM switch setting. When playback stops, the SBM indicator will light up if the SMB switch is set to ON and:

- the MONITOR switch is set to SOURCE.
- the REC MODE switch is set to STANDARD (48 kHz or 44.1 kHz).
- the INPUT selector is set to analog (LINE, MIC, or MIC ATT).

Playback

A



Counter Modes A

Each time you press MODE, the counter display changes as follows.

a) Absolute time
b) Elapsed time of the selection
c) Remaining time to the end of the tape*
d) Linear counter (tape running time)

* When playing back a pre-recorded tape (commercial), the remaining time to the end of the recorded portion appears.

To reset the counter (tape running time) to 0m00s

Press RESET.

Note

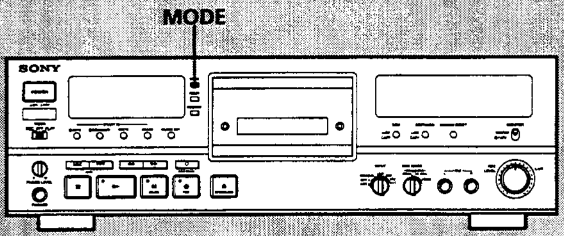
At the beginning of certain tapes, "BB" may appear briefly under the PGM NO. indicator.

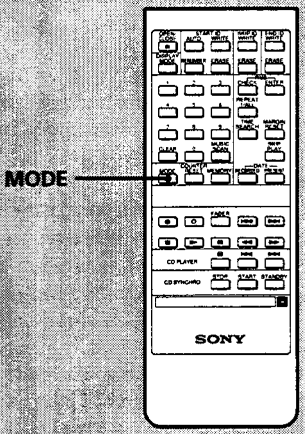
Remaining time does not appear at the following times

- Immediately after the start of playback. The remaining time will appear after about 16 seconds (in standard-play mode).
- When playback starts from a blank section (see page 22). Press ◀◀ or ⏮ until the remaining time appears.

Accuracy of the remaining time indicator

Since tape thickness (on the tape hub) serves as the basis calculating remaining playing time, unevenness during tape winding will cause slight differences in the displayed time and the actual remaining time.





Displaying the Sampling Frequency (Frequency Mapping)

Hold down MODE, then press numeric button 4. The sampling frequency of the recorded material will appear in the right display window about 16 seconds (32 seconds during long-play mode) after the start of playback.

Sampling frequency	Level meter display
32 kHz	Upper meter
44.1 kHz	Upper and lower meter
48 kHz	Lower meter

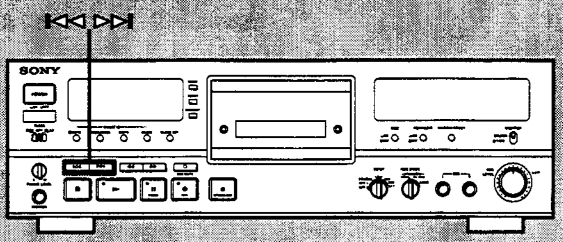
"TOP", "MID" and "END" indicate the beginning, middle and end of each tape respectively.
These, however, are approximate tape positions only, and may not correspond to the respective positions on actual cassette.

To restore the peak level meter display

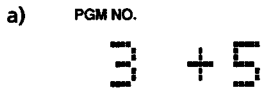
Hold down MODE and press numeric button 4 again.

When the EMPHASIS indicator lights

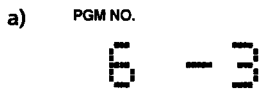
The built-in de-emphasis circuit automatically has detected and is lowering the high signal levels of portions recorded with emphasis (see page 25).



A



B



Other Playback Functions

Locating the Beginning of a Selection (AMS)

Press I◁◁ or ▷▷I to use the AMS function to go to the beginning of specific selections. If you press I◁◁ or ▷▷I while the unit is playing or stopped, the unit will go to the beginning of the specified selection, then begin playing the selection. If you press I◁◁ or ▷▷I while the unit is paused, the unit will go to the beginning of the specified selection, then enter pause mode. Press ❚❚ PAUSE or ▶ to start playback.
To use the AMS function, start IDs must be written on the tape (see page 39).

Locating the beginning of the next or succeeding selections

Press ▷▷I. Each press of the button causes the unit to go ahead to the beginning of each successive selection after the current one.

Example A

To go to the beginning of the fifth selection after the currently playing one, press ▷▷I five times.

a) The display shows the respective number of presses.

The unit locates the beginning of the specified selection, then resumes playback.

Locating the beginning of the current or preceding selections

Press I◁◁. Each press of the button causes the unit to go back to the beginning of the current selection, then to each successive selection before the current one.

Example B

To go to the beginning of the third selection before the current one, press I◁◁ four times.

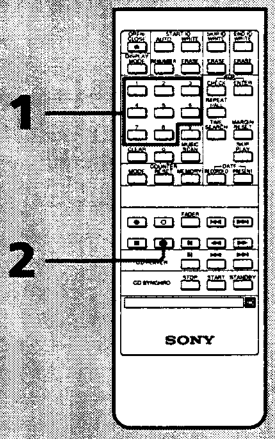
a) The display shows the respective number of presses.

The unit locates the beginning of the specified selection, then resumes playback.
When you press I◁◁ once to go to the beginning of the current selection, "0" appears.

Instead of pressing the AMS buttons, you can specify the number of presses with the numeric buttons on the remote commander, then press the respective AMS button (I◁◁ or ▷▷I).

Other Playback Functions

Specifying a Track Directly



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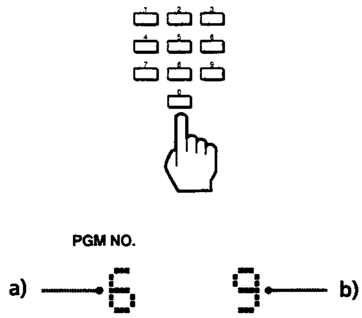


2

You can specify a selection directly by entering its program number using the numeric buttons on the remote commander. To use this function, selections must have program numbers (see page 44). This procedure can be performed only on the remote commander.

1 Specify the program number with the numeric buttons*.

a) Current program number
b) Specified program number

2 Press ►.

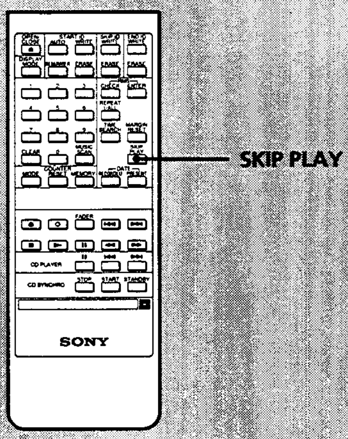
The unit locates the specified selection at high speed, then begins playing it from the beginning.

* If you change the unit to play pause before entering the program number, the unit will enter play pause at the beginning of the specified selection. Press ❚❚ PAUSE or ► to start playback.

If you enter the wrong program number

Press CLEAR to erase the wrong program number, enter the correct program number, then press ►.
If you press ► before clearing the specification, the unit will begin searching for the current specification. If this happens, press ■ to stop playback, then enter the correct program number.

Skip Play



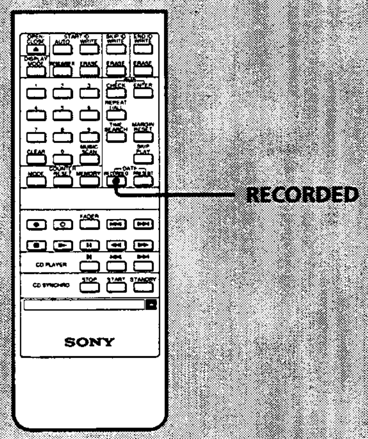
When the skip play function is on, the unit fast forwards the tape when it detects a skip ID, then resumes normal playback when it detects the next start ID, allowing you to skip specific portions of the tape. To write skip IDs, see page 48. This function can only be performed with the remote commander.

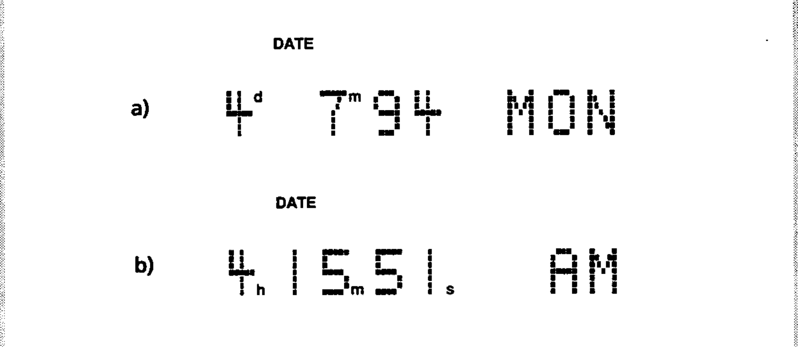
Press SKIP PLAY.

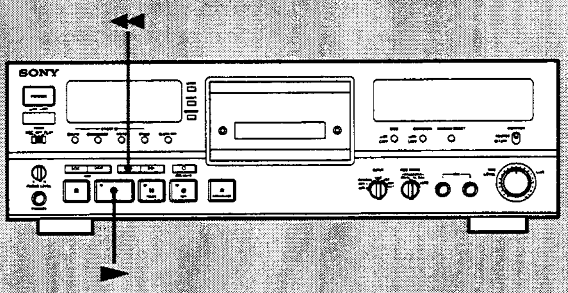
The SKIP indicator lights and the unit will skip portions marked by skip IDs.

To cancel the skip play function

Press SKIP PLAY again to turn off the SKIP indicator, or eject the cassette.







Other Playback Functions

Viewing the Recording Date

If the inserted tape contains date stamp information (see page 28), you can use the following procedure to view the recording date of selections.
Press RECORDED.
Each press of the button alternately displays the following information:
a) Date of recording
b) Time of recording

To display the current date

Press PRESENT.
Each press of the button alternately displays the date and the time. To restore the previous display, press MODE.

Playing Back After Rewinding (Auto Play)

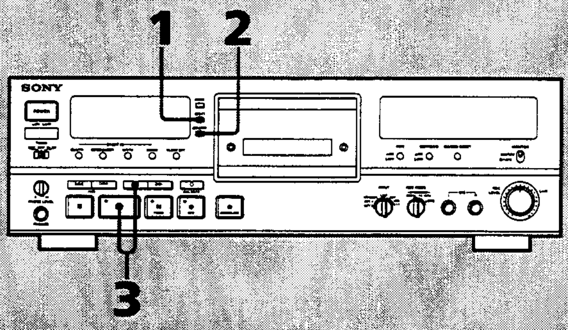
Hold down ◄◄, then press ►.
The tape will begin playing back after the winding to the start.

Note
If you perform the above procedure immediately after inserting a cassette, the auto play function will not operate. In this case, press ◄◄ to rewind the tape, wait a few seconds, then press ►.

Other Playback Functions

Locating a Position Using the Counter (Memory Play)

The memory play function allows you to memorize a specific tape position during playback, then automatically locate and play back from that position later.

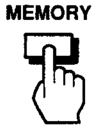


1 Make sure that the COUNTER indicator is on. Press RESET to reset the counter at the position to be memorized.
The counter indication changes to 0m00s. If the indicator is off, press MODE to turn it on.

1

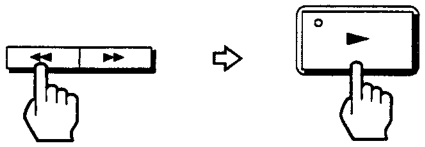
2 Press MEMORY.
The MEMORY indicator lights up.

2



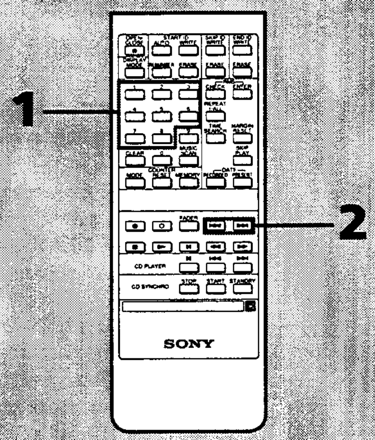
3 To return to the memorized position, press ► while holding down ◄◄ .
The unit rewinds to 0m00s, then starts playing back automatically.
If you press only ◄◄ , the unit rewinds to 0m00s, then stops (memory stop).

3

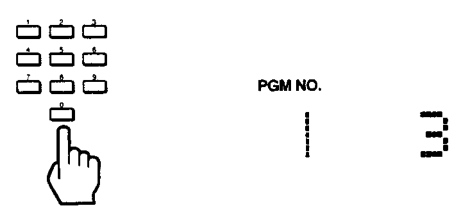


The memory play and memory stop functions do not operate when...

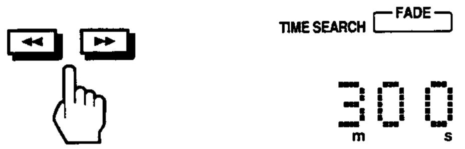
- other search functions, such as AMS, are operating at the time you press MEMORY.
- the COUNTER indicator is not lit.



1



2



Other Playback Functions

Locating a Position by Absolute Time (Time Search)

If the inserted tape contains absolute time codes, you can use the time search function to move ahead or go back a specific length of time. This operation can be performed only with the numeric buttons on the remote commander.

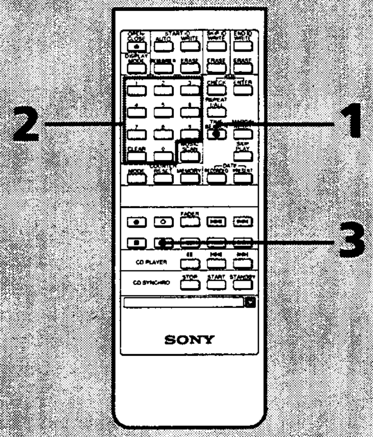
Moving the current position by time specification

1 **Keep pressing MODE until the ABS indicator lights, then enter the time with the numeric buttons on the remote commander.**
You can specify an absolute time span of 1 to 99 minutes. Time cannot be specified in seconds.
Example: To move 3 minutes away from the current position, enter 3.

2 **Press ►► to go forward or ◄◄ to go backwards.**
The unit fastwinds the specified length of time in the specified direction, then starts playing back automatically.
The time search specification appears in the left display window.

If you press ◄◄ or ►► during play pause
The unit goes to the specified position, then changes to play pause.

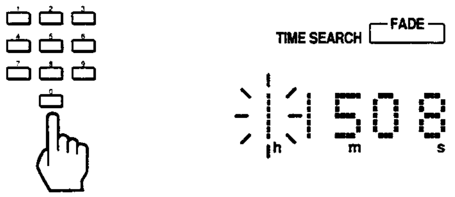
Other Playback Functions



1

TIME
SEARCH

2



3

Locating a time position from the beginning of the tape

1 Keep pressing MODE until the ABS indicator lights up, then press TIME SEARCH.
The clock display appears.

2 Enter the time from the beginning of the tape with the numeric buttons on the remote commander.
For example, to go to a position 1 hour, 15 minutes and 8 seconds from the beginning of the tape, press 1, 1, 5, 0, 8.

3 Press ►.
The unit fastwinds to the specified time position, then automatically starts playing from that position.

If you press ► in step 3 with the unit in play pause

The unit fastwinds to the specified time location, then enters play pause again.

Skipping the seconds specification

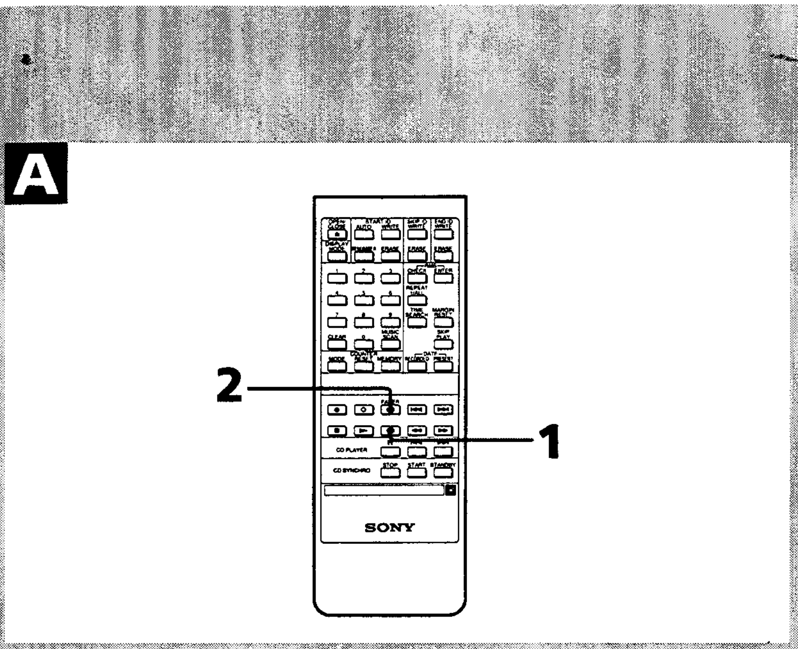
If your time specification does not include seconds, you can skip the seconds specification. For example, enter only 0, 0, 3 for 3 minutes.

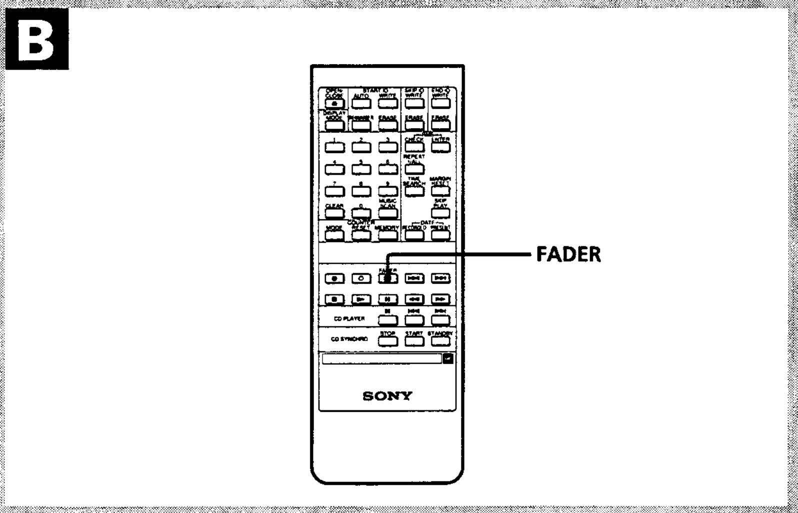
If you enter the wrong digit

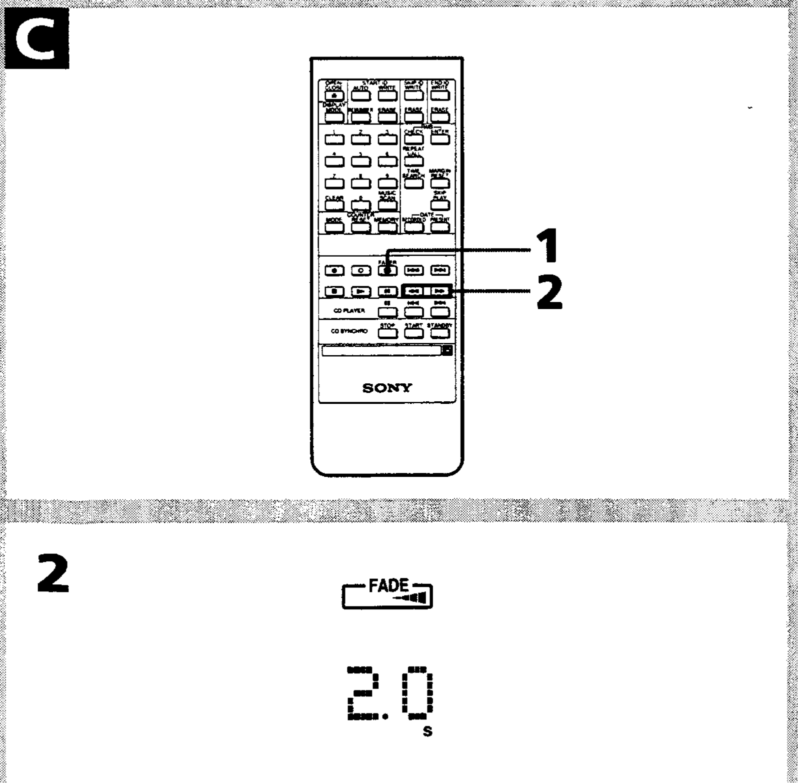
Press CLEAR. The digit just entered begins flashing again, allowing you to enter the correct digit.

Note

If you enter more than 60 for the minutes specification, "1m??s" appears on the display.







Other Playback Functions

Use the fade-in/fade-out play function to fade in or fade out the sound during playback.

Fade-In/Fade-Out Play

This operation can be performed only with the remote commander.

Fade-in play A

1 **While the unit is playing or stopped, press II PAUSE.**
The unit changes to play pause.

2 **Press FADER.**
The -◀ll indicator flashes and the sound fades in.

Fade-out play B

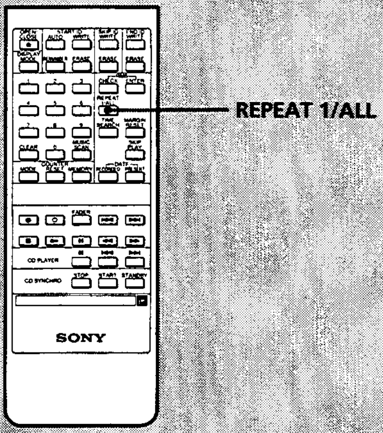
While the unit is playing, press FADER at the point where you want playback to start fading out.
The ll▶- indicator flashes and the playback sound fades out.
The unit starts to count down, then changes to play pause when it reaches 00s.

Specifying the fade duration C

You can specify a fade duration of up to 15 seconds (the factory setting is 5 seconds). The specification remains the same until next specified, even if the unit is turned off.

1 **Choose either ll▶- or -◀ll by pressing FADER while the unit is stopped.**

2 **Keep pressing ◀◀ or ▶▶ to specify the duration.**
Each press of ◀◀ or ▶▶ changes the duration in the following intervals:
1.0 sec to 3.0 sec in 0.2 sec intervals
3.0 sec to 5.0 sec in 0.4 sec intervals
5.0 sec to 15 sec in 1 sec intervals



Other Playback Functions

Repeat Play

The repeat play function allows you to play back specified selections repeatedly. After 5 repetitions, the unit automatically stops. This function can be performed only with the remote commander.

Playing a selection repeatedly

Keep pressing REPEAT 1/ALL while the selection to be repeated is playing until REPEAT 1 appears.
When the selection ends, the unit rewinds to the beginning of the selection and plays it again.

To cancel repeat play and return to normal playback

Keep pressing REPEAT 1/ALL until "REPEAT" goes off, or eject the tape.
When REPEAT 1 is selected, the following are treated as the end of the selection:

- The start ID at the beginning of the next selection
- A blank section of more than 9 seconds
- The end of the tape or an end ID
- A skip ID when skip play is activated (see page 58)

Playing all selections repeatedly

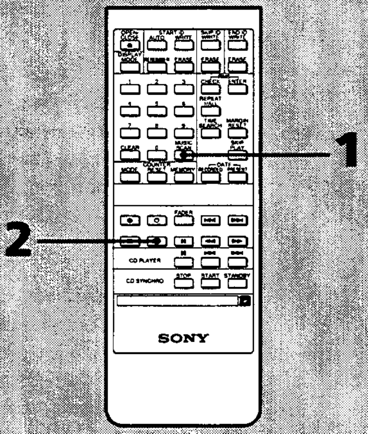
During playback, press REPEAT 1/ALL until REPEAT ALL appears.
When the tape ends, the unit rewinds to the beginning of the tape and plays the tape again. If the RMS function is activated (see page 67), the unit repeats only the programmed selections.

To cancel repeat play and return to normal playback

Keep pressing REPEAT 1/ALL until "REPEAT" goes off, or eject the tape.
When REPEAT ALL is selected, the following are treated as the end of the tape:

- The end of the tape or an end ID
- A blank section of more than 9 seconds

Other Playback Functions



1

2

Music Scan

If your tape has start IDs recorded on it (see page 39), the music scan function will play back a specific portion of the beginning of all selections on the tape to give you an idea of their contents. This function can be performed only with the remote commander.

1 While the unit is stopped*, press MUSIC SCAN.
The MUSIC SCAN indicator flashes and the specified scan time appears under the MARGIN indicator.
To enter a new scan time, press ◀◀ or ▶▶ while the scan time appears on the MARGIN display.
* If you press MUSIC SCAN during playback, the unit rewinds to the beginning and music scan automatically starts with the first selection.

2 Press ▶.
The unit rewinds to the beginning of the tape, then scans each selection for the specified amount of time. START ID lights up on the display during playback.

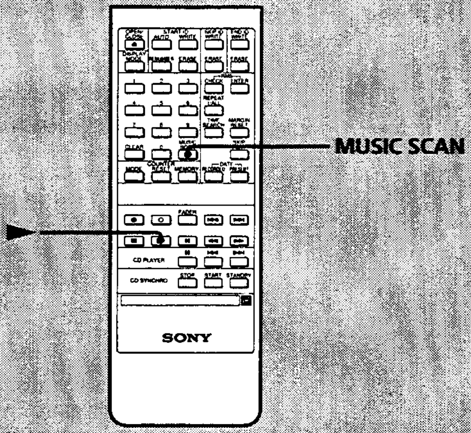
If you press ▷▷I instead of ▶ in step 2

Scanning of selections begins with the first start ID after the current selection, and continues until the end of the tape.

If you press I◁◁ instead of ▶ in step 2

Scanning of selections begins with the first start ID before the current selection, and continues until the beginning of the tape.

Note
In case of tapes with a start ID too near the end of the tape, scanning from the end of a tape towards the beginning may not be possible. If the start ID is unnecessary, erase it and attempt the music scan again.



Other Playback Functions

To continue listening to a selection during music scan
Hold down ► while the beginning of the selection is still playing. The selection will continue playing as long as you hold ► down.

To continue listening to an entire selection
Press MUSIC SCAN while the beginning of the selection is still playing. The music scan function is canceled and the selection continues playing.

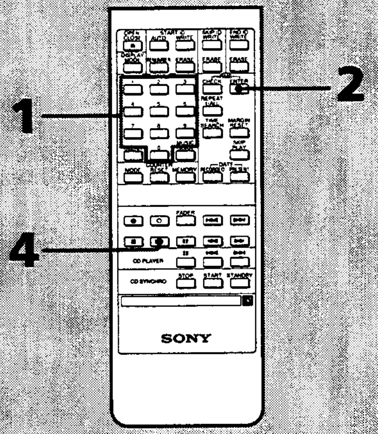
Scanning duration
You can specify a scan time of up to 15 seconds in step 2. The default is 8 seconds. Once specified, the scan time remains the same until next specified, even if you turn off the unit.

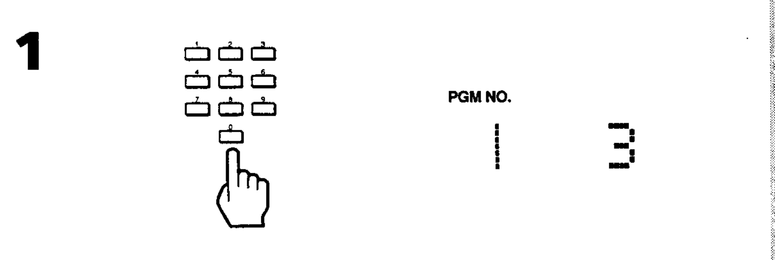
Note
You can specify the scanning time only when a tape loaded in the deck.

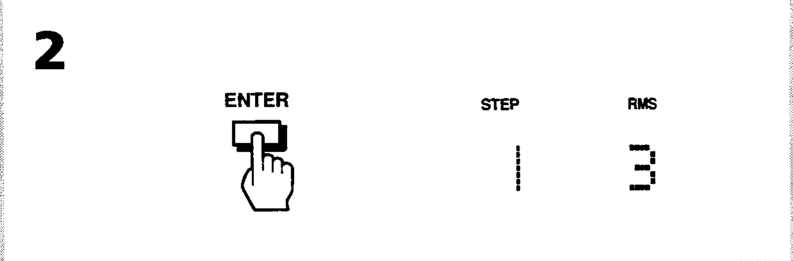
Other Playback Functions

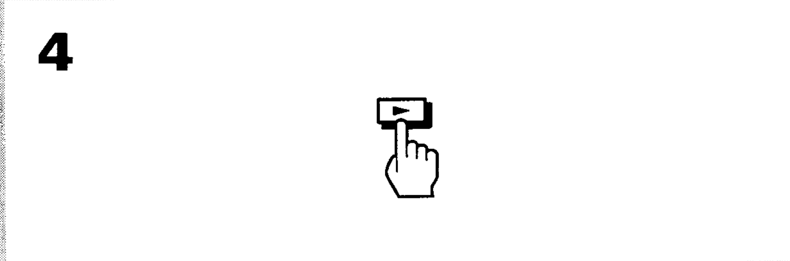
Random Music Sensor (RMS) Operations

The RMS function allows you to determine the playback order of specific selections. To do this, program numbers must be recorded on the tape. This function can be performed only with the remote commander.









1 While the unit is stopped, specify the selection to be programmed with the numeric buttons.
You can enter a number up to 99.

2 Press ENTER.

3 Repeat steps 1 and 2.
You can program up to 99 selections.

4 Press ►.
The programmed selections begin playing back in the order they were entered.

To stop RMS play

Press ■.

To review the contents of an RMS program

Keep pressing CHECK. The programmed selections appear on the display in the order they were programmed, starting with the first one.

To add selections to the program

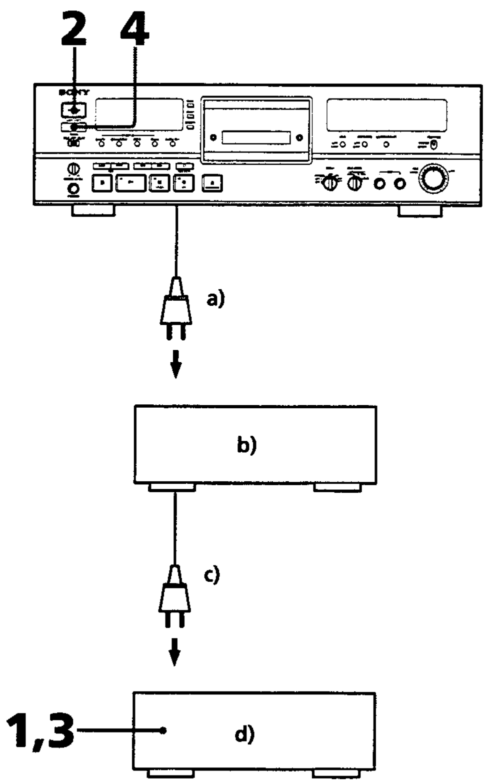
Press ■ to stop RMS play, then perform steps 1 to 4 in the procedure above to add selections. You cannot add selections while RMS play is activated.

To delete the last selection entered

Press CLEAR to erase the program number just entered, then enter the correct program number. Note that program numbers cannot be erased during reviewing using CHECK.

To erase an entire program

While the unit is stopped: press ■ once.
While RMS play is activated: press ■ twice.
You can also erase the program by turning off the unit.



Timer-Activated Operations

By using an optional timer, you can automatically record or play back at a preset time. For details, refer to the instructions accompanying your timer and amplifier.

Timer-Activated Recording

1 Turn on the timer.

2 Turn on the DAT deck, and prepare the unit for recording. (Follow steps 1 through 9 on page 26.)

3 Set the timer.
Power to the amplifier and the DAT deck goes off. Leave the power switches on all equipment set to ON.

4 Set TIMER to REC.
At the preset time, power goes on and about 4 seconds later, recording starts. The AUTO indicator will resume the status it was in before power to the DAT deck turned off.
If the AUTO indicator is on, start IDs will be automatically written during recording.

Fig.
a) to the AC outlet
b) Amplifier
c) to the AC outlet
d) Timer

When timer-activated recording is completed, set TIMER to OFF.

Notes

- If the TIMER switch is left at the REC position, recording will start the next time power is turned, and the tape contents will be erased.
- The auto rewind function does not operate during timer-activated recording and the tape will not be rewound when it reaches the end. This is to prevent the tape from being recorded over again.
- Make sure a cassette is properly loaded in the deck. Timer-activated recording may not work if the cassette compartment is open.

Timer-Activated Playback

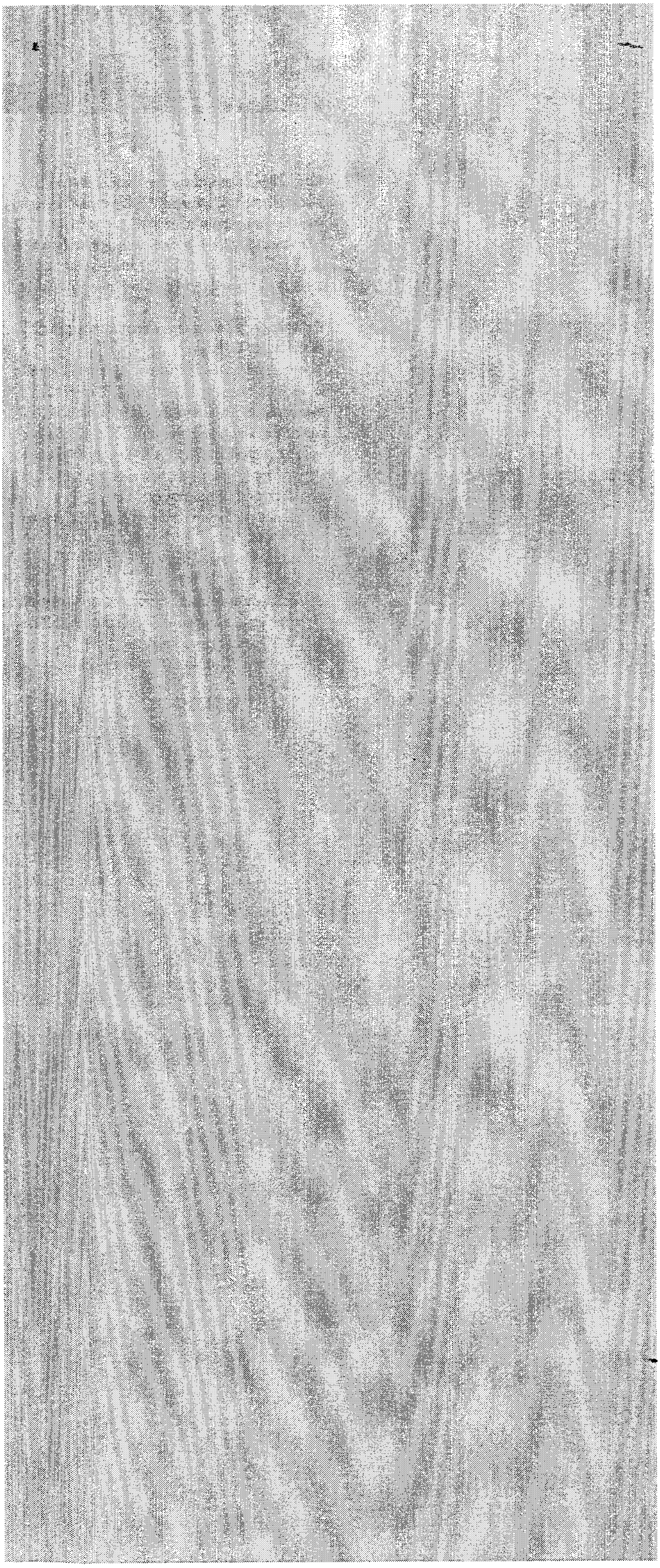
1 Turn on the timer.

2 Turn on the DAT deck, and insert the cassette.

3 Set the timer.
Power to the amplifier and the DAT deck goes off. Leave the power switches on an equipment set to ON.

4 Set TIMER to PLAY.
At the preset time, power goes on and about 4 seconds later, playback starts.

When timer activated playback is completed, You should normally set TIMER to OFF. To start playback at a preset time every day, leave TIMER at PLAY.



Maintenance

Cleaning the Cabinet

Clean the cabinet, panels and controls with a soft cloth slightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzine.

Cleaning the Head

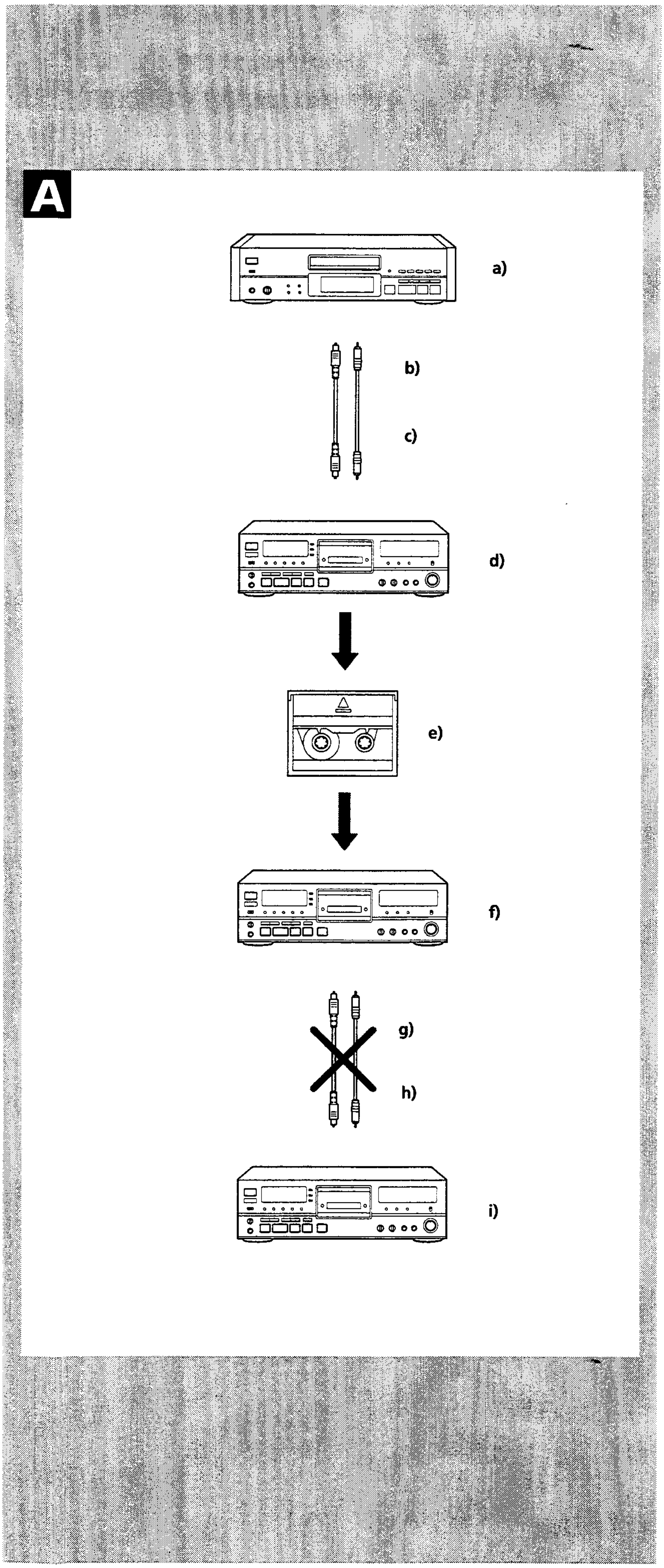
Prolonged operation will cause contamination of the head.
To obtain the best possible recording and playback sound, we recommend that you use the Sony DT-10CL cleaning cassette (not supplied) to clean the head after every ten hours or so of operation.
Clean the head with the cleaning cassette when the unit will not be used for a long period of time. Contamination of the head may cause sound drop-out during playback.

How to use the cleaning cassette

1. **Insert the cleaning cassette as you would a normal DAT cassette.**
2. **Press ►. After about 10 seconds, press ■.**
3. **Remove the cleaning cassette without rewinding it, then proceed with recording and playback with a normal DAT cassette and check the sound quality.**

Notes on the cleaning cassette

- The cleaning cassette cannot be used for recording and playback.
- Do not repeat the cleaning procedure more than 5 consecutive times. Excessive cleaning of the head may cause wear to the head.
- Do not rewind the cleaning cassette after each use. Rewind the cleaning cassette tape only when it reaches the end.
- The cleaning cassette can be used for up to 200 ten-second cleaning sessions.
- Due to the shortness of the cleaning cassette, the linear counter will not show the actual running time and remaining time of the cassette.



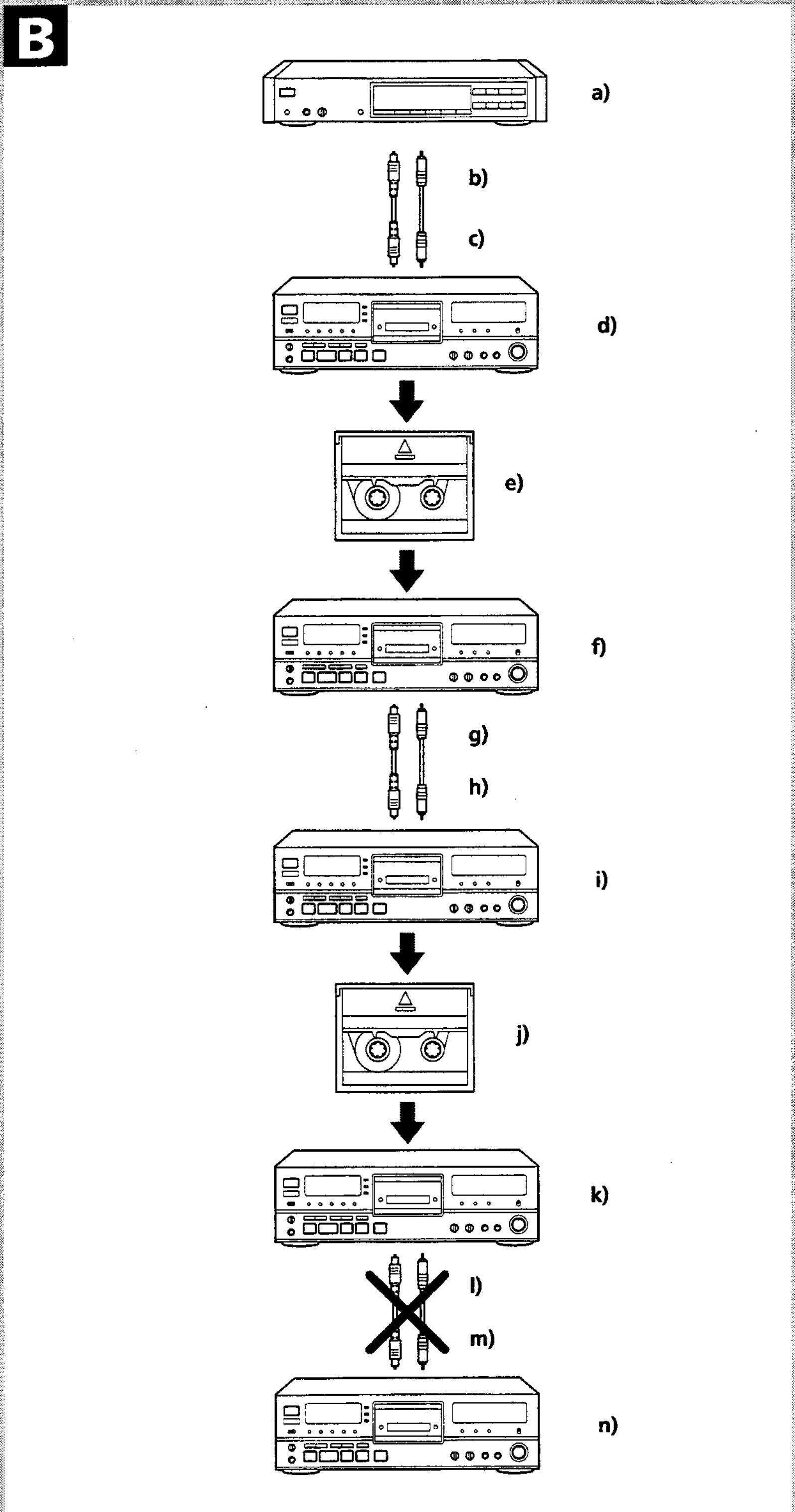
Guide to the Serial Copy Management System

Your DAT deck uses the Serial Copy Management System (SCMS) which allows you to make only a single copy of a recorded digital source through a digital-to-digital connection. The limitations imposed by this system are illustrated as follows.

Example A : Recording a compact disc to DAT tape

You can make a digital copy of a CD onto DAT tape (through a digital-to-digital connection), but you cannot use that DAT tape to make a second digital copy. Only analog copies of the DAT tape are possible.

a) Compact disc player
b) Coaxial digital cable or optical digital cable
c) Digital input/output
d) DAT deck
e) First-generation digital recording made through a digital-to-digital connection
f) DAT deck (playback)
g) Coaxial digital cable or optical digital cable
h) Digital input/output
i) DAT deck (recording)



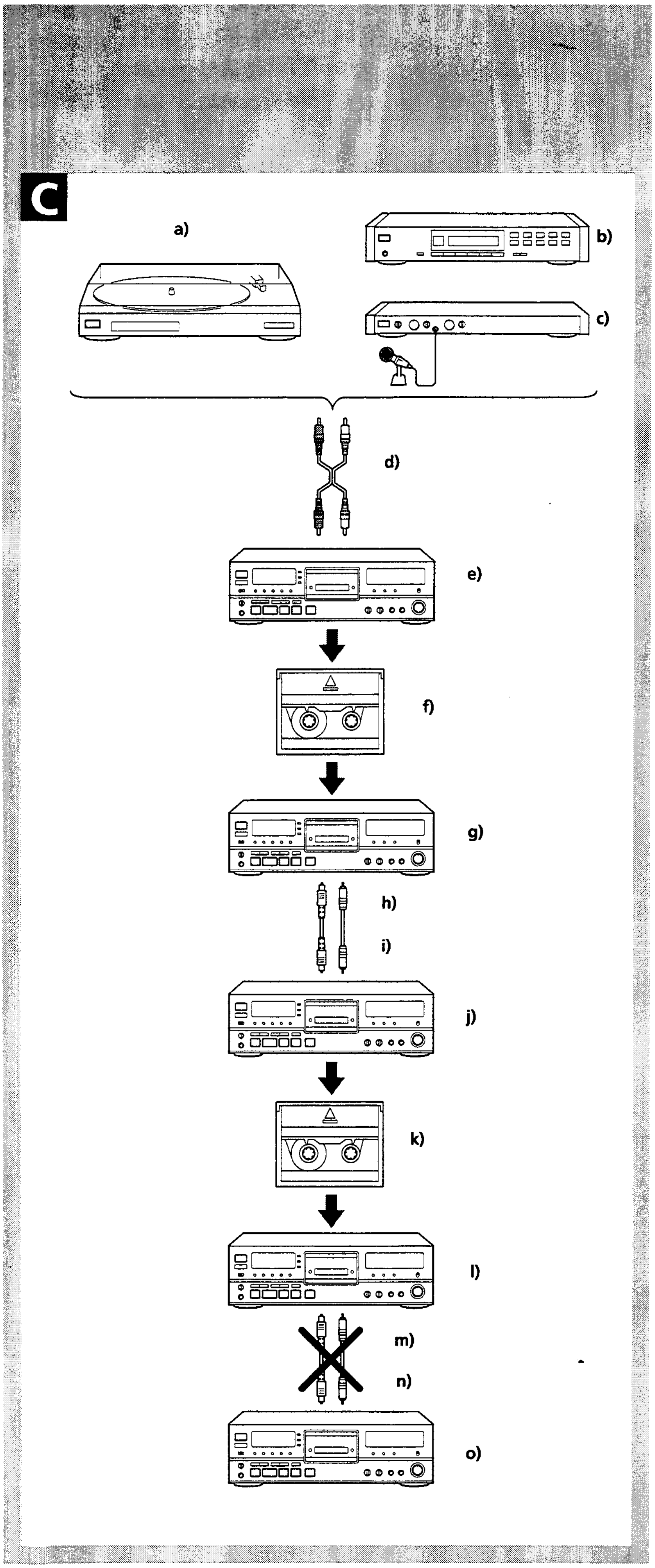
Guide to the Serial Copy Management System

Example B : Recording a digital signal of a broadcast satellite to DAT tape

You can make a digital recording of a digital satellite broadcast onto DAT tape (through a digital-to-digital connection), then use that DAT tape to make a digital copy on another DAT tape. Afterwards, only analog copies of the DAT tapes are possible.

a) BS tuner
b) Coaxial digital cable or optical digital cable
c) Digital input/output
d) DAT deck
e) First-generation digital recording made through a digital-to-digital connection
f) DAT deck
g) Coaxial digital cable or optical digital cable
h) Digital input/output
i) DAT deck (recording)
j) Second-generation digital recording made through a digital-to-digital connection
k) DAT deck (playback)
l) Coaxial digital cable or optical digital cable
m) Digital input/output
n) DAT deck (recording)

Guide to the Serial Copy Management System



Example C : Recording an analog source to DAT tape
You can record an analog source to DAT tape (through an analog-to-analog connection), then use the DAT tape to make a digital copy (through a digital-to-digital connection). Afterwards, only analog copies of the DAT tapes are possible. Note that the same restriction applies when recording from CD players, BS tuners, and DAT decks through an analog-to-analog connection.

a) Turntable
b) Tuner
c) Microphone amplifier
d) Analog input/output
e) DAT deck
f) Tape recording mode through an analog-to-analog connection
g) DAT deck (playback)
h) Coaxial digital cable or optical digital cable
i) Digital input/output
j) DAT deck (recording)
k) First-generation digital recording made through a digital-to-digital connection
l) DAT deck (playback)
m) Coaxial digital cable or optical digital cable
n) Digital input/output
o) DAT deck (recording)

Notes

- No restrictions apply when copying between two DAT decks through an analog-to-analog connection.
- These restrictions do not apply when using a DAT deck that does not adopt the Serial Copy Management System.
- When recording a digital source through a digital-to-digital connection, the DAT deck records at the same sampling frequency as the original.

Specifications

Tape	Digital audio tape
Recording head	Rotary head
Recording time	Standard: 120 minutes Long-play mode: 240 minutes (with DT-120)
Tape speed	Standard: 8.15 mm/s Long-play mode: 4.075 mm/s
Drum rotation	Standard: 2,000 rpm Long-play mode: 1,000 rpm
Error correction	Double-Read Solomon code

Tape

Track pitch	13.6 µm (20.4 µm)
Sampling frequency	48 kHz, 44.1 kHz, 32 kHz
Modulation system	8-10 Modulation
Transfer rate	2.46 Mbit/sec
Number of channels	2 channels, stereo
D/A conversion (Quantization)	Standard: 16-bit linear Long-play mode: 12-bit non-linear
Frequency response	Standard: 2–22,000 Hz (±0.5 dB) Long-play mode: 2–14,500 Hz (±0.5 dB)
Signal-to-noise ratio	Standard: more than 94 dB Long-play mode: more than 94 dB
Dynamic range	Standard: more than 94 dB Long-play mode: more than 94 dB
Total harmonic distortion	Standard: less than 0.0035% (1 kHz) Long-play mode: less than 0.075% (1 kHz)
Wow and flutter	Below measurable limit (±0.001% W. PEAK)

Input

	Jack type	Impedance	Rated input level
LINE IN	Phono jack	47 kilohms	–4 dB
DIGITAL IN	Phono jack	75 ohms	0.5 Vp-p, ±20%
DIGITAL IN	Optical jack	—	—
MIC	Phone jack	47 kilohms	–44 dB

Output

	Jack type	Impedance	Rated output	Load Impedance
LINE OUT	Phono jack	470 ohms	–4 dB	More than 10 kilohms
PHONES	Stereo phone jack	220 ohms	1.3 mW	32 ohms
DIGITGAL OUT	Phono jack	75 ohms	0.5Vp-p, ±20%	75 ohms

DIGITAL OUT (optical jack) wavelength: 660 nm

General

Power requirements	120 V AC, 60 Hz
Power consumption	50 W
Dimensions	Approx 430 x 135 x 380 mm (w/h/d) (16 $^{15}/_{16}$ x 5 $^{3}/_{8}$ x 15 inches)
Weight	Approx 11.5 kg (25 lb 6 oz)

Remote commander (supplied)

Remote control system	Infrared control
Power requirements	3V DC, with two size-AA (R6) batteries
Dimensions	Approx 63 x 19 x 175 mm (w/h/d) (2 $^{1}/_{2}$ x $^{3}/_{4}$ x 7 inches)
Weight	Approx 130 g (5 oz) incl. batteries

Supplied accessories

Remote commander (1)
Sony batteries SUM-3 (NS) (2)
Audio connecting cords (2 phono plugs-to-2 phono plugs, stereo for line inputs and outputs) (2)

Design and specifications are subject to change without notice.

Optional accessories

Optical cable	DOC-15SP etc.
Connecting cord	RK-C510HG or equivalent (2 phono plugs-to-2 phono plugs: gold-plated connectors and high fidelity LC-OFC line cord) VMC-10HG or equivalent (phono plug-to-phono plug): for digital connection
Cleaning cassette	DT-10CL

Troubleshooting Guide

Function Buttons and Tape Transport Problems

Symptom	Cause	Remedy
The tape ejects after being loaded.	The cassette is inserted incorrectly.	Insert the cassette correctly (see page 20).
The tape does not move.	Buttons are inoperative during the first 4 seconds after power is turned on.	Wait until the ❚❚ indicator stops flashing, then try again.
	❚❚ PAUSE is activated. (The ❚❚ indicator lights up.)	Press ❚❚ PAUSE to release pause.
	The tape has reached the end.	Press ◀◀ or ⏮ to rewind the tape.
Sound is not output.	The connections are incorrect.	Make the connections properly (see pages 16 to 17).
	The connected amplifier is incorrectly operated.	Operate the amplifier as required for deck operation. (Refer to the operating instructions of the amplifier.)
	The REC MONITOR switch is set to TAPE.	Set the switch to SOURCE.
Recording cannot be made.	The safety tab of the cassette is open.	Close the tab (see page 20).
	The INPUT selector is incorrectly set.	Set the INPUT selector correctly. When recording sound from equipment connected through digital input/output, set the INPUT selector to COAXIAL, OPT1 or OPT2. When recording sound from equipment connected through analog input/output, set to LINE.
	The REC MONITOR switch is set to TAPE.	Set the switch to SOURCE.
	The source signal input to the digital input jack includes a digital copy prohibit signal.	Connect the source equipment to LINE IN.
No sound plays back from the recorded tape.	When recording analog signals, the recording level is turned down completely.	Adjust the recording level with the REC LEVEL control (see page 30).
The CAUTION indicator lights up and all buttons are inoperative.	Moisture has condensed inside the unit.	Leave the unit turned on for about an hour then turn on the unit from off again (see page 4).
The SBM indication does not light up during playback.	The SBM function operates only during analog recording. This is not a malfunction.	—

Sub-Code Operation

Symptom	Cause	Remedy
Sub-codes cannot be written.	The safety tab of the inserted cassette is open and recording is not possible.	Close the tab (see page 20).
A start ID cannot be written during recording.	A start ID cannot be written within 9 seconds (18 seconds in long-play mode) from the end of the previous start ID.	Leave at least 9 seconds (18 seconds in the long-play mode) between the last start ID and the new one.
Search function does not stop at the specified selection.	The start ID of the specified selection is less than 9 seconds long (or 18 seconds in long-play mode).	Erase the start ID (see page 43), then write it again (see page 42).
	The distance between two start IDs is less then 18 seconds (36 seconds in the long-play mode).	When writing start IDs manually, leave an interval of more than 18 seconds (36 seconds in the long-play mode) between them.
	The specified program number does not exist on the tape.	Use RENUMBER to renumber the program numbers (see page 46).
	The program numbers are out of order.	
The search function operates suddenly during playback.	The skip play function is on. (The SKIP PLAY indicator is lit.)	Turn off the indicator by pressing REPEAT 1/ALL.
	The repeat play function is on. (The REPEAT indicator is lit.)	Turn off the indicator by pressing REPEAT 1/ALL.
The search function does not operate.	There is a blank section between selections. (The sampling frequency indicator flashes.)	Use the end search function (see page 33) before recording to avoid creating blank sections.
The tape operation buttons do not operate during the writing of a start ID.	All buttons (except ❚❚) are inoperative during the writing of a start ID (9 seconds or 18 second).	Wait until after the start ID is written to operate the buttons.
Absolute time codes cannot be written.	Recording began within a blank section.	Rewind the tape to the beginning, or locate the end of the existing material with the end search function (see page 33), then start recording from that point.
An end ID cannot be written during playback.	An attempt was made to write the end ID to a blank section.	Press ◀◀ to move the tape out of the blank section, restart playback and repeat the procedure for writing an end ID (see "Rehearsal function" on page 51).
The renumbering function does not operate.	A start ID is written near the end of the tape.	Erase the start ID (see page 43).

(Continued on next page)

Troubleshooting Guide

(Continued from previous page)

Others

Symptom	Cause	Remedy
Tape transport is excessively loud during fastwinding.	This noise is caused by the cassette and is not a mechanical problem.	—
The tape stops suddenly.	The cassette is defective or damaged.	Press ⏏ OPEN/CLOSE and change the tape.
Unbalanced left and right volume.	The recording balance is incorrectly adjusted.	Adjust the recording balance correctly with the REC LEVEL control (see page 30).
Increasing noise or sound deterioration.	The head is dirty.	Clean the head with a cleaning cassette (see page 69).
The date stamping function stops operating after the power is turned off.	The battery in the unit is weak.	Have the battery replaced by Sony service personnel.
After pressing ◀◀ / ▶▶ or |◁◁ / ▷▷|, the tape begins moving after a momentary pause.	This is normal and is not a mechanical problem.	—

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